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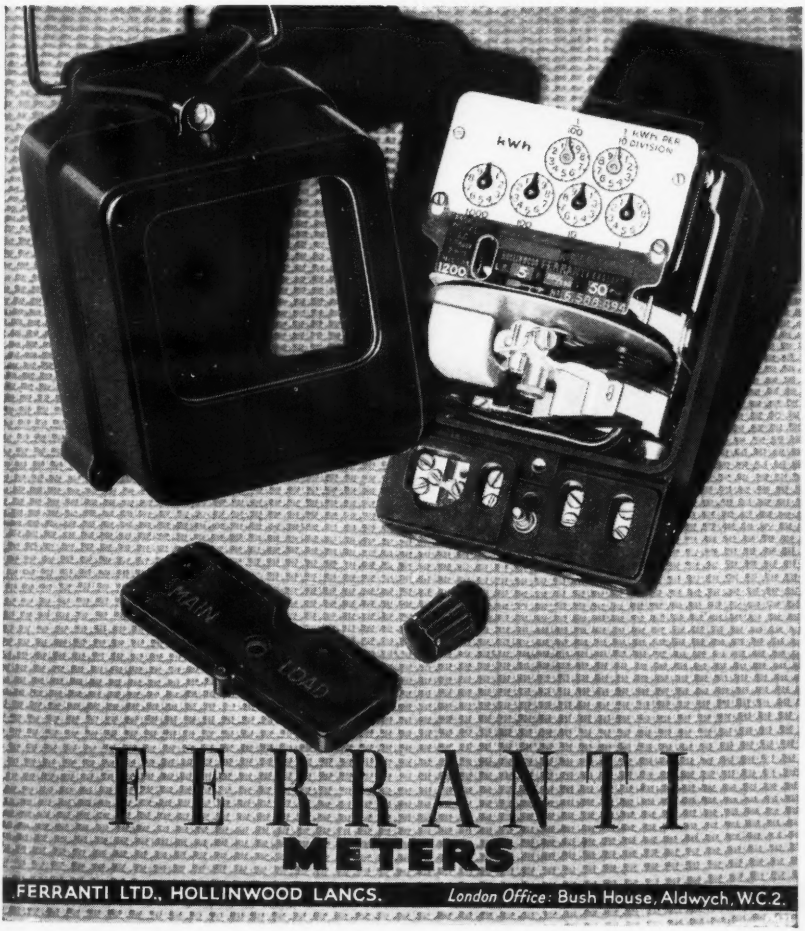

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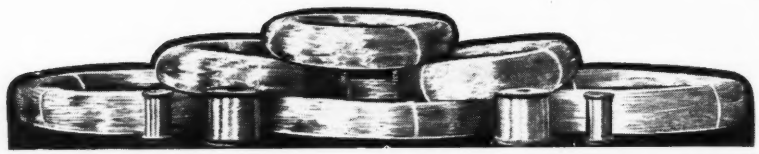

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ELECTRICAL REVIEW

Volume CXXX — No. 3354

Friday, March 6, 1942

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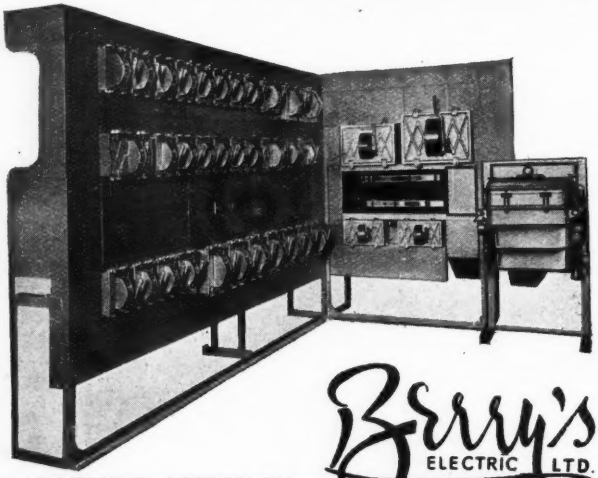

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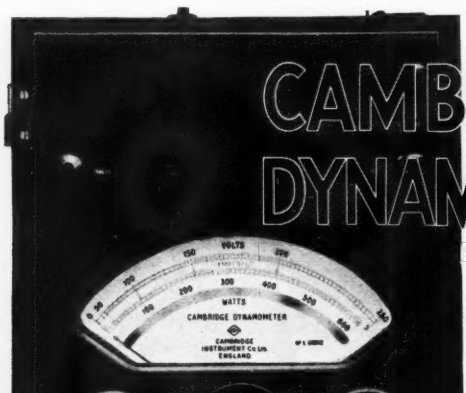

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Vol. CXXX. No. 3354. MARCH 6, 1942 6d. WEEKLY

Distribution Standards

Application of "Grid" Principles

NO general development in the direction of applying the broad principles governing economical electricity supply has taken place in distribution that is comparable to what has been done on the generation side by means of power station interconnection. These principles we take to be the utmost use of plant capacity that is consistent with reliability and the minimising of operation losses by methods which secure the advantages of standardisation without precluding the full exploitation of advances in technique and which are flexible enough to cope with any new loads.

Planning on Standard Lines

No doubt most can be accomplished by increasing the sales of electricity (see Kennedy and Noakes, *I.E.E. Journal*, July, 1933), but there is equally no doubt that mains engineers can make a material contribution by planning distribution systems on standard lines based on the principles enunciated. That is not to under-rate the considerable forethought that has been devoted in recent years to the design of supply systems that will meet foreseeable fresh demands, especially with regard to the running of high-voltage mains in relation to strategic points. It would, however, greatly assist the object in view if the low-voltage and high-voltage cables and substations were considered together and laid out on lines that could be applied anywhere.

The first worked-out proposals for a standard distribution system were, we believe, those made some fifteen years ago (Beard and Haldane, *I.E.E. Journal*, January, 1927), but there has been a long wait for the particulars now available (*idem*, Part 2, December 1941) of actual experience of a scheme that bears this character. Among the merits of the solid network described by Mr. J. W. Leach is that it supersedes the old DC feeder idea by taking advantage of the ability to transform AC to the required voltage at any point. It makes good use of diversity of demand for saving copper, reducing voltage drop and providing duplication of cables. It also keeps short-circuit kVA within reasonable bounds and limits the area likely to be affected by system disturbances.

Scope for Further Inquiry

Such a distribution grid, which pools transformer capacity, would appear to be a counterpart of the C.E.B. generation grid, taking into account the limited area that can be covered by medium voltage. The question is how far do methods that have proved successful and less costly in Central London provide a criterion for standardised distribution. In its favour is the point that Mr. Leach's scheme embraces six amalgamated distribution systems and includes many sizes and types of cable.

Further investigations are needed into such problems as the minimum load densities at which a scheme of this kind would be feasible, the optimum loading of each network section and to what extent this optimum figure would be offset by the use

of high-rupturing-capacity fuses as advocated by Mr. B. Wood in a later I.E.E. paper, if this proves practicable in the conditions envisaged. Data are also required as to the best standard cross-sectional area of conductors for new work, the relative size of new loads which should be supplied at high-voltage and the burning clear of faults, It is to be hoped that the I.E.E. Post-War Planning Committee and Section K of the E.R.A. will be able to give these matters their early consideration as being fundamental to the development of lower-voltage distribution on sound lines.

Netherlands East Indies

IN this issue there appears an article upon electrical conditions in the Netherlands East Indies showing that with the return of peace in this troubled area there are substantial possibilities for British electrical manufacturers. At the moment the situation there is very grave; Java, probably the most important island of the group, from a strategic point of view, is being over-run by the Japanese, in spite of the magnificent defence being put up by the Dutch and their allies. Yet who can doubt that the author's optimism is justified and that the Japanese triumph will be merely a passing incident?

Street-lighting Contracts

MR. JUSTICE CASSELS in the King's Bench Division last week held that a street lighting contract entered into before the war must be adhered to although the object of that contract had been affected by wartime conditions. He considered that the plaintiffs (Egham U.D.C.) had been unwise in not foreseeing the possibility of such a position when it entered into the contract but this, no doubt, applies to many other lighting authorities throughout the country. A stay of execution, pending notice of appeal, was granted and as the action is something of a test case further developments will be watched with interest.

Importance of Plastics

ALTHOUGH in present circumstances, particularly, the employment of plastic materials may be regarded as a temporary expedient, it is quite possible that the necessity may prove a virtue. This view was strongly emphasised by Mr. K. M. Chance at last week's meeting of British Industrial Plastics, Ltd. He said that it was becoming recognised that plastics had qualities of their own and, for many purposes, had the very qualities which were needed to fill the requirements of the modern world, not as substitutes for, but as improvements on, anything that the older industries could supply.

Conserving Rubber Cable

LAST week the Cable Makers' Association stated that the Government had urged the need for using other than rubber-insulated cables wherever possible and in this issue we give some particulars of steps taken in Australia to conserve the limited stocks of these cables. In general the recommendations made by the Ministry of Munitions are sound, particularly those designed to minimise the length of interior wiring—a good thing at any time. There may, however, be some misgiving over the suggestion that 250-V grade cable should be used instead of 660-V grade where the pressure to earth does not exceed 350 V. There is also some risk in replacing parts of old installations when it may be inferred that the whole of the wiring is not in too good a condition.

Too Much Margin

FACTOR of safety expressed as the ratio of working stress to breaking stress of a structure has its not always legitimate analogy in electrical practice, where there is sometimes truth in the flippant variation "factor of ignorance." A margin between the loading and rating of motors, transformers and cables, rarely justified in ordinary circumstances, now represents so much unused metal and insulation at a time when the luxury cannot be afforded. Generally, more use can well be made of permissible overload capacity than is customary.

Post-War Credits

THE bitter pill of the 100 per cent. Excess Profits Tax was conveyed to industry with a slight coating of jam in the shape of a qualified promise that a part of the amount paid would be repaid after the war. Income tax payers were similarly comforted. At the recent meeting of the English Electric Co., Mr. G. H. Nelson expressed the view held by many that the promise should take a more tangible form. While, no doubt, the Government's word is its bond, there is much virtue in documentary evidence.

Boiler Control

A Modern Centralised Installation

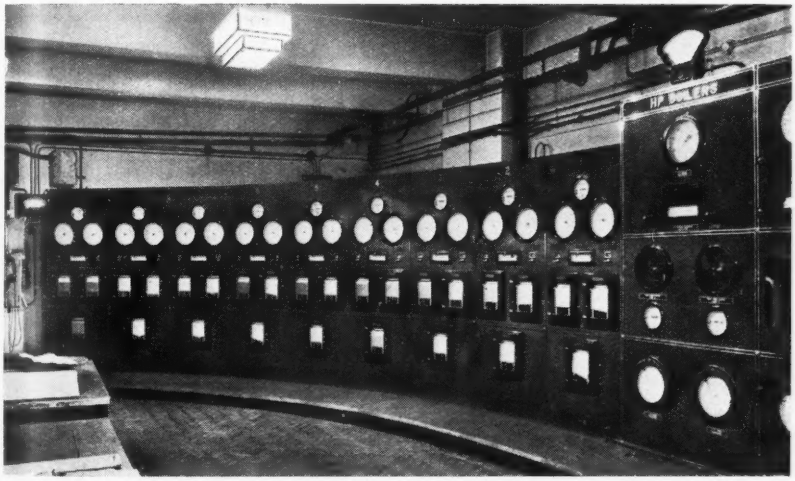
IN selecting an installation as the subject for this article we made no particular search for novelty, for our main object is simply to deal with the application of centralised boiler control to modern and proved plant, methods and conditions. For these reasons we have deliberately avoided automatic boiler control, which we regard as belonging to an independent field and for which some form of centralised arrangement is essential. The installation chosen comprises ten large boilers, which may be regarded in three sections, Nos. 1 to 6, Nos. 7 to 9 and No. 10, representing three stages in the development of the boiler plant as a whole.

The system described is employed in an installation comprising ten large boilers and has the merit of simplicity

The first six boilers each have normal and maximum continuous evaporation ratings of 250,000 and 312,000 lb. of steam per hour, respectively, with a peak load capacity of 330,000 lb. per hour. The steam conditions are 615 lb. per sq. in. and 850/875 deg. F. Each boiler is of the Babcock & Wilcox vertical header, straight inclined tube pattern with a single-pass multi-loop superheater interposed between the lower and the upper tube banks. It is fired by a Taylor stoker of 20 retorts with a projected grate area of 752 sq. ft. set in a Bailey water-cooled furnace. The stoker motor is a 20-HP variable speed, DC machine with a speed range of from 350 RPM to 1,400 RPM, and the stoker grate is of the standard horizontal reciprocating type.

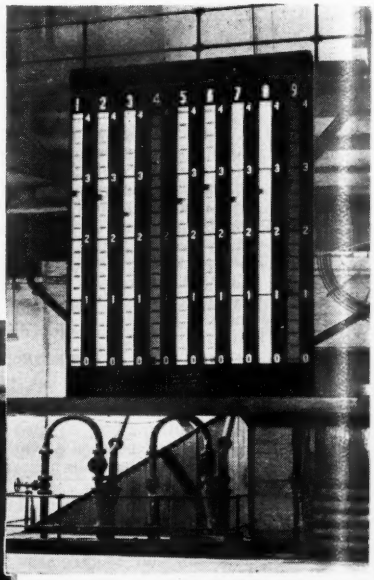
The gases from the boiler rise through a flue which delivers them into the top of the bare-tube economiser in which they flow downwards and from the bottom of which they pass into a tubular air preheater and thence upwards to a grit collector. The gases are drawn through the collector by four Davidson induced-draught fans, and discharged into gas-washing plant. There are also four forced-draught fans to each boiler, while all eight fans are driven through Vulcan-Sinclair hydraulic couplings. The i.d. and f.d. fans are driven by 260-HP, 725-RPM and 115-HP, 525-RPM motors, respectively, and the normal fan speed ranges are from 200 RPM to 725 RPM. The air temperature at the grates is 300/320 deg. F.

Nos. 7 8 and 9 boilers are somewhat larger than those already referred to, each having normal economic and maximum continuous ratings of 312,000 and 375,000 lb. of steam per hour, respectively, and a peak load capacity of 400,000 lb. of steam per hour. Constructionally they are similar, except that each boiler has a

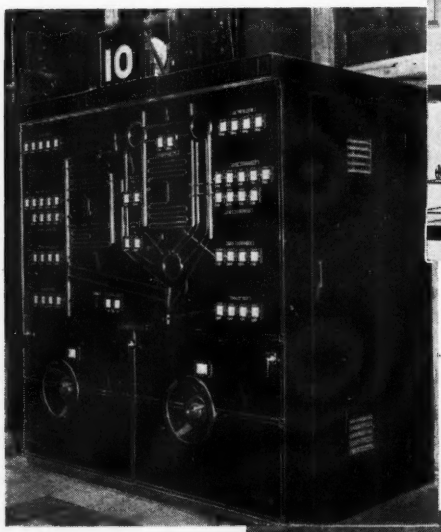


In the central control room is accumulated all the information to ensure efficient running

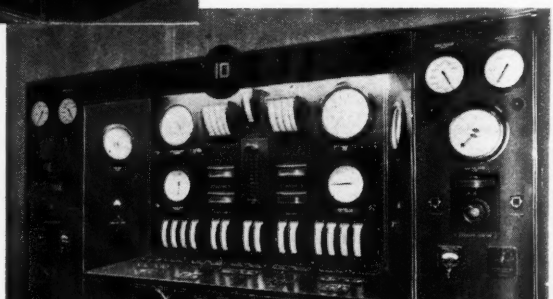
Green's gilled tube economiser and two Ljungstrom rotary air heaters, while the Taylor stoker grate, which is of the "Q" vertical reciprocating type with an area of 787 sq. ft., is hydraulically operated from a motor-driven oil pump. There are two i.d. and two f.d. variable-vane Howden fans, driven by 360/160-HP, 970/725-RPM and 127/56-HP, 970/725-RPM two-speed motors, respectively. The steam and other conditions are similar, except that the maximum steam temperature is 900 deg. F. The feed water temperature is 340/355 deg. F. There are three motor-driven and three steam-driven feed water pumps, each of which deal with from 725,000 to 1,100,000 lb. of water per hour at 785 lb. per sq. in., the



The giant load indicator exercises an overriding influence on the boiler control



Above: The soot blowing for No. 10 boiler is centrally controlled from a board adjacent to the main board

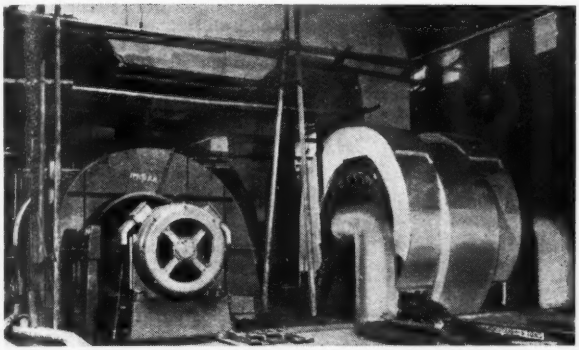


Right: The latest central control board is an all-steel welded structure

electrically driven pumps being served by 1,100 and 1,500 HP, 1,480 RPM motors.

The latest section of the installation, No. 10 boiler, represents a combination of the Stirling tri-drum and B. & W. header constructions, with two-stage superheating, and a B. & W. continuous loop economiser. It has Taylor stoker firing with a vertical reciprocating grate having an area of 918 sq. ft. The grate is driven by a variable-speed DC 23-HP motor, with Ward Leonard control from a motor-generator set giving a speed range of from 1,400 RPM to 140 RPM. There are two i.d. and two f.d. variable-vane two-speed

Howden fans, driven by 825/440 HP, 880/725-RPM and 726/146-HP, 725/580-RPM motors, respectively. The air-to-grate temperature is 445/470 deg. F. The boiler has normal economic and maximum continuous ratings of 440,000 and 550,000 lb. of steam per hour, and the steam conditions are 1,420 lb. per sq. in. and 965 deg. F. There are one two-speed steam-operated and two pairs of motor-driven pumps in series each having a capacity of 600,000 lb. per hour with a final feed pressure of 1,685 lb. per sq. in. The feed water inlet temperature is 400 deg. F.



For the f.d. (left) and i.d. (right) fans remote control is effected by a Tate control mechanism for operating the vanes

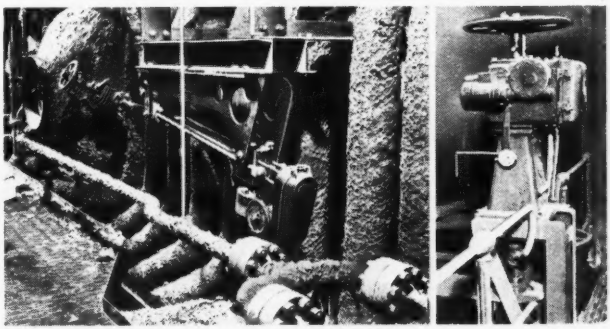
Boilers Nos. 1 to 9 are all fitted with "Duo" type feed water regulators, while the latest boiler is served by the new Hopkinson electrical thermostatic type of feed water regulator. All ten boilers are fitted with electrically-operated steam stop valves.

Control Functions

Each of the ten boilers has its own individual system of central control from a board containing the necessary switches for operating the auxiliaries and a full range of indicating instruments. In all cases the following auxiliaries are subject to centralised control: stoker, i.d. and f.d. fans, i.d. and f.d. dampers and steam stop valves. (Secondary air fans and clinker crushers have local controls for boilers 1-9). In addition to these the air heaters of Nos. 7 to 10 boilers are centrally controlled, while in the case of No. 10 boiler only there are the following additions to the central control system: secondary air fans and clinker crusher, super-heater gas by-pass damper control and feed water regulator control.

With regard to stoker control there are on the control board for each of Nos. 1 to 6 boilers a simple starter and speed regulator for the stoker motor and a change-over switch for putting the spare motor into commission. Similar arrangements are provided for each of Nos. 7, 8 and 9 motors, except that the hydraulic pump motor is operated, instead of the actual stoker motor. In the case of No. 10 boiler the motor generator serving the DC stoker motor is operated from the central board, the operation including the necessary field regulation to effect the Ward Leonard speed regulation of the stoker motor. The clinker crusher control is a very simple arrangement of remote control for starting and stopping.

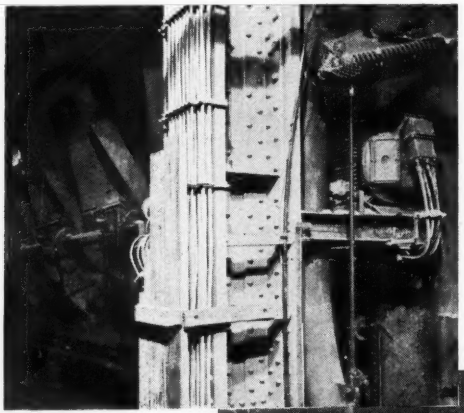
In the case of each of Nos. 1 to 6 boilers the i.d. and f.d. fan motors are all constant-speed machines, so that the centralised operation consists of controlling a small motor-operated weir in the oil tank, thus governing the amount of oil in the coupling and the consequent slip. For each of Nos. 7 to 10 boilers the remote fan control is effected by the necessary change-speed operation for the two-speed motors, and a Tate control mechanism for operating



A special thermostat (left) controls the regulator motor governing the feed water valve (right)

and closing the vanes on the fan suction. Actually the latter operation is effected by a small geared motor housed in the regulator.

All the main dampers throughout the complete installation are motor-operated, but a simple system of pulleys and wires brought to the centralised control board operates the f.d. undergrate dampers. The stop valve control in all cases consists simply of the necessary arrangements for remotely operating the valve motors from the central board. There are two single-speed secondary air fans per boiler,



Above: Operation of the stoker motor embraces Ward Leonard control for speed regulation

Right: The steam stop-valves are remotely controlled from the individual central board

operated locally for boilers Nos. 1-9, but having centralised control arrangements embodying simple remote starting and stopping of the fan motors and vane control from the control board for No. 10 boiler. Further, in the case of both the air heater motors and the superheater gas by-pass dampers the control is simply a matter of remote motor starting and stopping.

The steam temperature control scheme adopted is the Hopkinson "Attemperator" system, and this varies between Nos. 7, 8 and 9 boilers, and No. 10 boiler, in that, in the former group the temperature control is effected after the steam leaves the boiler, whereas in No. 10 boiler the control is effected between the primary and secondary superheaters. Referring to No. 10 boiler, the temperature of the outgoing steam from the boiler to the turbines is "felt" by an electric thermostat in the pipe line at the boiler exit. This thermostat controls an electric regulator which operates on a camshaft controlling a series of spray nozzle valves. High-pressure feed water is fed through these valves and discharged through the spray nozzles which are inserted in the pipe line between the primary and secondary superheaters.

The six nozzles, which are housed in two groups of three, in two chambers, are arranged so that the water is sprayed in a sequence operation to give extremely fine control. The thermostat has a differential of $\pm$ 1½ deg. F. and it directly operates the "Attemperator" regulator in one of the cubicles forming the wings of the control board. There is, of course, a separate "Attemperator" for each of the two boiler outlets. The motor drives the valve-operating camshaft through gearing and chain, and for emergency use there is provision for hand control of the camshaft. This system is used in conjunction with the superheater gas by-pass dampers.

The essential feature of the feed water regulation system adopted for No. 10 boiler is an inclined-tube thermostat connected at the top and the bottom to the steam and water sides of the downtake drum, respectively, and situated at such a position that the normal water level of the boiler is somewhere about the mid-point of the tube; thus varia-

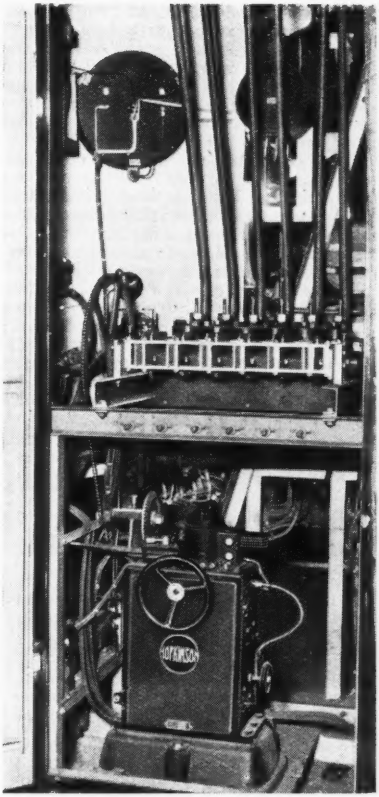
tions of the water level in the tube result in changes in the length of the tube, the movements of which are transmitted to external reversing contacts controlling the regulator motor governing the feed water valves. Actually this feed water regulation scheme operates automatically, but hand control for the central panel is also provided.

Control Panel Described

As the individual central control boards for all the boilers are similar, apart from variations in the boiler functions actually controlled by the system, there is no point in describing more than the most recently installed board, namely, that for No. 10 boiler. This is an all-steel welded structure with sheet panelling on a stout framework, and it measures about 15 ft. long by 8 ft. wide and 4 ft. from back to front. The complete structure stands on anti-vibration rubber mountings. It has seven faces with a recessed central portion with one horizontal foot panel and two vertical wing panels in the foremost vertical plane, linking up with the recessed central panel by three sloping panels, two vertically from the wing panels and one horizontally from the foot panel. The central panel is floodlighted from a concealed source in the canopy at the top, and the individual instruments have dashboard lighting.

The central recess or instrument panel accommodates the following: super-heated steam pressure, saturated steam pressure, economiser feed inlet pressure and draught gauges; final gas temperature, hot air to grates temperature, steam flow, CO_2, smoke density, stoker speed and remote water level indicators; and ammeters for the fan motors. On the bottom sloping or desk top portion are arranged the controls for the following ; f.d. fans, secondary air fans, air heaters, stoker motors, i.d. fans, f.d. fan discharge dampers, clinker crusher, i.d. fan discharge dampers. The base front panel contains the undergrate dampers and boiler stop valve controls, a fault trip alarm lamp, the change-over switch for lighting on the board, a pilot lamp for the DC supply to the board, an alarm cut-out for the fan switchgear, the CO_2 recorder switch, a pilot lamp for the DC supply for the feed water regulators and superheaters, and a pilot lamp for a DC standby supply for the last mentioned items.

The vertical wing panels are devoted to the instruments and regulators for the temperature control or de-superheating system, the items including de-superheating, steam and water pressure for outgoing steam, steam temperature alarms, the superheater gas by-pass damper control, hand controls for the multi-way control valve and temperature alarm hooters. On the vertically inclined panels are the feed water flow meters, and the hand control device for the electric feed water regulators, including a hand or automatic control change-over switch, and a valve position indicator. This



The temperature control thermostat directly operates the "Attemperator" regulator in one of the wing cubicles

control panel was produced and supplied by Hopkinsons, Ltd., as part of the complete centralised control system for No. 10 boiler, for which they were responsible. The boards for the other nine boilers were supplied by Electroflo Meters Co., Ltd.

An essential feature of No. 10 boiler is a comprehensive centrally controlled soot-blowing installation which was described fully in the ELECTRICAL REVIEW of July 18th last. It comprises 49 blowers, all told, which are all electrically operated and automatically controlled from a separate board adjacent to the boiler control board proper. To commence the sequence of the complete blowing operation it is merely necessary to press one master push button on the control board.

Maybe a better term for the installation under consideration would be centralised *operation*

rather than centralised *control*. Anyhow, this thought arises from consideration of a central control room to which we must now refer, and which, although no operation is effected from it, is the nerve centre in which is accumulated all the vital information necessary to ensure efficient running conditions for the complete boiler plant.

There is a panel on this board for each boiler, and that for No. 10 boiler contains three-point temperature recorders for outgoing steam temperatures; a 30-point temperature indicator for gas at boiler, economiser, air heater and fan outlets; air-to-grates, feed water at economiser inlet and outlet and outgoing steam temperatures; a two-point recorder for final gas, and hot air to grate temperatures; a smoke density recorder; a two-point recorder for superheated steam outlet and economiser feed inlet pressures; and feed water flow recorders and integrators. An additional feature of this board is two test panels for the high-pressure and extra high-pressure, respectively. They contain various steam and water pressure and flow meters and other instruments to afford precise information for testing purposes. The panels can be connected to any one of the boilers which may be under test at any one time.

Another feature of the complete boiler installation, which exercises an overriding controlling influence, is a giant load indicator situated at one end of the firing aisle. This measures about 12 ft. high and 11 ft. wide, and includes a number of illuminated columns one for each boiler, and indicates each boiler's output in hundreds of thousands of pounds of steam per hour. A further overriding control is a critical pressure gauge with a 60-in. scale which indicates the main receiver steam pressure.

In concluding this description we think it important to emphasise the extreme simplicity of the whole system, which has contributed mainly to the undoubted success of the installation.

Provincial Electric Supply Association

THE annual meeting of the Provincial Electric Supply Association was held in London on February 25th. In his report submitted to the meeting, Mr. S. S. Grant (chairman) referred with regret to the retirement from the industry of Mr. C. H. Jones, a member of the Executive Committee of the Association.

The Joint Committee of Electricity Supply Associations had had much important work to do. The friendly atmosphere of this Committee, on which the Association was represented by Mr. A. J. Fippard and Mr. J. C. Dalton, was a happy augury for the future, and he hoped it would be kept in being to deal as a co-ordinating body with the many problems which would face the industry after the war. The work of the Public Utilities Coal Committee had assisted materially in warding off the necessity of fuel rationing during this winter. The immense amount of work which any scheme of fuel control must entail, bearing in mind their depleted staffs, would seriously affect the efficiency of their organisations. Their members had loyally supported the voluntary campaign for economy.

War Damage Insurance

With regard to the war damage scheme for public utilities, there was a consensus of opinion that the most equitable method, taking the industry as a whole, was to apportion their contributions as to 50 per cent. on the basis of kWh sold, and as to 50 per cent. on the revenue from the sale of electricity, excluding bulk supplies in each instance. A proviso was included to the effect that the figures to be used in the computation should be the figures for 1938 as shown in the Electricity Commissioners' returns, except where the corresponding figures in the year preceding the date of the levy were less. In such cases the lower figures were to be taken.

They viewed with some misgiving the proposal by the Electricity Commissioners to amend the existing form of accounts, and through the Joint Committee of Electricity Supply Associations the Commissioners had been advised that, bearing in mind the depletion of staffs, the time was not opportune to deal with such matters as this. They had little time to spare for anything but the work in hand; the problem of man-power in their undertakings promised to become more acute. A number of their member companies had also been severely taxed, after bombing raids, to maintain supply. They took legitimate pride in the performance of the industry under the strain put upon it, and asked that so far as possible they might be left to carry on.

On the subject of man-power, the National Service Committee and the Joint Committee of Electricity Supply Associations had recently made strong representations through the Electricity Commissioners, the outcome of which was favourable to the industry. Members would be circularised with particulars as soon as possible*

The number of requests for advice and guidance sent in to the Association had increased considerably during the year.

* [This presumably refers to the matter dealt with at some length in the ELECTRICAL REVIEW of February 20th (p. 249) under the heading "Electrical Man-Power."—EDITORS, ELECTRICAL REVIEW.]

I.E.E. Scholarships

APPLICATIONS are invited for the Duddell, Silvanus Thompson and William Beedie Esson Scholarships awarded by the Council of the Institution of Electrical Engineers. Applications must be received not later than April 15th, and inquiries for full particulars and nomination forms (specifically mentioning the name of the Scholarship) should be addressed to the Secretary of the Insitution, Savoy Place, London, W.C.2.

Electricity in the N.E.I.

An Optimistic View of the Future

By G. O. McLean, M.Eng.

THE Netherlands East Indies is of great strategical importance, and is now one of the main fronts in the Pacific war zone. The islands are very rich and the social and economic development due to the enlightened colonial policy of the Dutch has been outstanding, so that a brief note on the engineering side—present and future—and particularly how this will affect us may not be out of place.

It is necessary first to glance at existing standards and the type of plant in general use and compare them with our own. Naturally all pre-1940 developments were based on Continental practice, which was not necessarily German, though standards were very similar to V.D.E. Generation and transmission voltages of 6 and 11 kV and 115, 70 and 30 kV respectively at 50 cycles are, however, near enough to our own figures to call for very little modification of standard products. In common with other tropical and Pacific countries, *e.g.*, India and New Zealand, much of the power is obtained hydraulically and the usual practice has been the use of vertical spindle Francis turbines up to 20,000 kW capacity per unit down to small 50-HP Pelton wheels. Good quality coal is (or was) mined in Java, Sumatra and Borneo so that there are small steam stations near the coalfields and the big industrial areas; but the size of units and the steam conditions are small compared to our units, namely, 5,000 kW capacity and stop valve conditions of 250 to 300 lb. per sq. in., and 750 deg. F. total temperature, while circulating water temperatures enforce exhaust conditions of 27·0 in. to 27·7 in. Hg.

The author, after seventeen years in the electricity supply industry in this country and the East, is now chief engineer to a large engineering concern in the Netherlands East Indies

Diesel-engine Sets

In a territory with plentiful and cheap supplies of oil one would naturally expect this fuel to be widely used, and quite 80 per cent. of the various estates, tea, rubber, copra, etc., employ Diesel engines (with direct-coupled AC or DC low-voltage generators) up to 1,500 HP and many of these are of British manufacture. The archipelago stretches widely from west to east and the great distances naturally mean overhead lines for transmission. We have not been widely experienced or so favourably placed as the Continent and America in this field so we find fully insulated neutrals with Petersen coils at every major substation and high quality lightning protection a very prominent feature.

On the distribution side, except for the variety of voltages in the different districts and the natural use of metric-sized conductors and their own standards regarding paper and lead thicknesses, etc., practice does not appear to be very different from our own. Three-phase 4-wire (equal section) paper-insulated lead-covered cables are standard in the towns though the armouring is generally double tape, as this form gives greater protection against white ants and other insects. As in this country, rural distribution is overhead on wooden poles, pole-mounted transformers being prominent. Owing to the greater distances feeders are generally radial but paralleled.

On the installation side the safety of the consumer is looked after by regulations and inspections by a Government Bureau of Safety, but these do not appear to be as stringent as in this country. Differences that are noticeable are the widespread use of two-pin plugs and sockets (naturally of Continental gauge) metal-cased lampholders and switches, and the use of zed fuses instead of small rewirable porcelain cut-outs. Direct starting of small motors (in some districts up to 10 HP) is permitted and above that push-button contactor starting (star-delta and auto-transformer) is favoured.

The ownership and the administration of the supply industry have been entrusted to a few large limited companies in the past, but the Government has exercised some control, and has considered it its duty to develop the latent natural water power of the territory.

On the light-current side there has been the same degree of enlightened development; and here the Central Government has direct control, telegraph, telephones and radio being administered by P.T.T., Java. As would be expected for immense distances, overhead lines are used, and porcelains have in the past been standard Continental double-skirted ones with extra stiff stalks to cope with tropical storms. British standard insulators have come into use since 1940. Main traffic routes are also being cabled, and large-size trunks to British P.O. standards are on order.

Many of the principal telephone exchanges (so far manual) have been of British manufacture, and the latter have had no difficulty in complying with the demands of the Dutch engineers for special features to cope with

tropical moisture conditions. Automatic exchanges have passed the stage of "being thought about" or even the design stage and the progress of the Pacific war in the next four months is the only factor holding up the placing of the first order.

The radio trade was something of a monopoly for the Motherland before Eindhoven became part of occupied territory, and a strict licensing system is still in force. British manufacturers have in the last two years readily complied with the rigid specification for receiving sets, but owing to war conditions supplies have not kept pace with demands.

Future Restoration

When prime ministers and presidents refuse to prophesy it may seem rash for a mere engineer to look ahead; and yet surely such action is justified when the view is a long one, and when the spirit of the people concerned is considered and not their present precarious plight. So then even if the worst happens and Java, the heart and centre of the Colony falls, it will not remain in enemy hands for ever. Work which has taken generations to build up and develop will have been destroyed (as thoroughly and conscientiously though sorrowfully as Tarakan and Palembang); but that will not deter the great-hearted Dutch and Javanese from building afresh and building bigger and better. They will naturally take advantage of all the latest improvements and developments in the Allied countries and British industry must naturally play its full share.

What are these demands likely to mean to the electrical industry? A recent survey in the *Times Trade and Engineering Supplement* (July and August, 1941) of available water-power in the territory has given this as three million horse-power, and no time would be lost in placing orders for the larger schemes involving the least civil engineering work and which could be put into commission the soonest. These would involve not only the station plant itself but a great deal of transmission equipment, step-up and step-down transformers, switchgear, protective equipment and many miles of towers with insulator strings and conductors. New industries necessitated by the war and hence in the embryo stage would be rapidly developed; and this would involve supplies of distribution equipment of all kinds as well as motors and control-gear.

Diversity of Demand

It would surprise readers (but occupy too much space) if details could be given to illustrate the diversity of these new industrial demands, but suffice it to say that they range from plant for oleaginous products, such as tung and other essential oils, to many machine tools for shipbuilding and tube-forming machines for bicycle frames, tea racks and tubular furniture. As already indicated, plans for new trunk telephone routes and automatic exchanges are already well advanced and will be proceeded with as soon as the enemy is pushed out. Another major development, consequent upon the restoration of Palembang and other oil producing areas to their rightful owners, and the reinstatement of the necessary oil-well plant, will be the introduction of Diesel-electric traction and in some areas complete electrification.

Finally, having outlined the present circumstances and the possibilities it may be asked if British manufacturers are aware of the future opportunities and if they are in a position to do their share. This article would not have been worth writing or publishing if there was an unqualified affirmative answer to these questions; but the writer knows from his own experience that many directors, when they have time to think about it, do realise the potentialities in the Netherlands East Indies.

Many of the leading manufacturing firms have already appointed agents in the territory; and orders for steam-plant and generators, transmission and distribution equipment, telephones and radio plant have already been placed in this country as a taste of what can be expected. These manufacturers, confident of the quality of their goods, know that they have only to ensure that their costs are fair and not inflated, to be sure of reaping the rewards of their foresight; and at the same time know that they are helping a territory and people that have shown themselves worthy of helping.

New Zealand Notes

THE *Electrical Engineer and Merchandiser* reports that contracts have been let for three 30,000-kW generating units for the Karapiro hydro-electric station on the Waikato River. These units will be the largest in New Zealand, the turbines being rated at 42,000-HP each. The contract for the turbines has been placed with Boving & Co. and that for the generators with the Metropolitan-Vickers Co., the total price being about £300,000. Construction of the dam and excavations for the power station have been commenced and the scheme will take about three years to complete. When the Karapiro scheme is fully developed the small Horahora station will be dismantled, for the new dam will flood this site; in fact the water will stretch back almost to the tail-race at Arapuni.

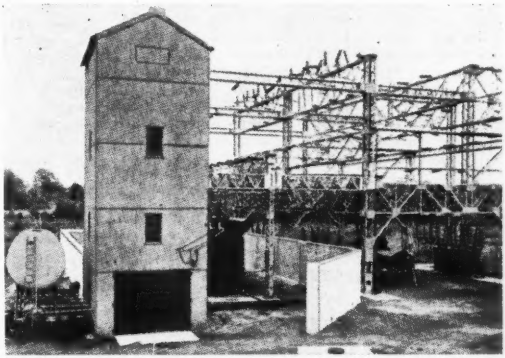
At the December meeting of the Auckland Electric Power Board, states the *New Zealand Electrical Journal*, it was decided that applications for electric water heating supply should be refused unless they were accompanied by an application for the installation of an electric range or the premises already possessed a range. It was further decided that the 24-hour flat rate for water heating installations should be withdrawn for all future domestic installations and that these should be allowed only when the supply was metered and controlled by a thermostat.

American Notes

Conflicting Views of the Power Situation

LATEST information from the United States indicates a difference of opinion regarding the adequacy or otherwise of the nation's power resources. According to Mr. Leland Olds, chairman of the Federal Power Commission, there is insufficient power available or projected to meet the defence requirements of the next three years without either additional capacity or a material curtailment of use. The *Electrical World* quotes Mr. Olds as estimating the shortage at "several million kilowatts" this year, rising to three or four million in 1943, with a "very difficult situation" in 1945 and 1946.

In the same issue our contemporary reports a statement by Mr. C. W. Kellogg, president of the Edison Electric Institute, to the effect that "with a surplus of more than nine million kilowatts of generating capacity above the greatest demand for power, and with the construction of an equal amount in prospect during the next three years, the outlook for sufficient electric power to meet all war demands is reassuring." Mr. Kellogg indicated that it was possible that a few localities affected by drought or by excessive piling up of defence loads might face a limited amount of power rationing. His statement was based upon the results of a survey to determine the effect of the great increase in scope of Government expenditure incidental to America's entrance into the war.



Concrete structure for the protection of transformers against sabotage

Power Plant Moved

In order to provide power quickly for a magnesium plant in Texas a low-pressure 40,000-kW turbo-generator and six 155,000-lb. per hour boilers at the Hell Gate station of the Consolidated Edison Co. of New York are being dismantled and removed to the distant site. It is reported that a 40,000-kW or 60,000-kW set may be purchased from the Detroit Edison Co. for the magnesium plant, as well as a topping turbine now nearly complete at the manufacturers' works.

Increased Manufacturing Activity

The managing director of the National Electrical Manufacturers' Association recently said that last year the American electrical manufacturing industry was called upon to handle direct defence business more than $2,000,000,000 in value and a similar volume of indirect defence and other business. The total volume was 75 per cent. above that for 1940—an unequalled achievement. During 1942 not more than 10 per cent. of the production would be for civilian uses.

The production of generating equipment continued at an accelerated rate, twice as much being turned out in 1941 as in 1940. Transmission and distribution equipment output was estimated to have increased by 90 per cent. over 1940, and electrical industrial apparatus, particularly electric motors registered a gain of 114 per cent. Employment throughout the industry had increased by about 70 per cent. in the last two years.

Anti-Sabotage Measures

Throughout the United States steps are being taken to protect power plants and distribution systems against saboteurs. Guard units have been formed and special fencing and floodlighting are being employed. One municipal authority in New York State has been reproved by the State Public Service Commission for being the only body which had failed to comply with an order to erect an 8-ft. wire fence topped by barbed wire round all power plants.

The accompanying picture, reproduced from the *Electrical World*, shows the method adopted by one utility of protecting transformers against sabotage. The silo-like structure is a concrete hollow-block wall 10 ft. high and 7 in. thick enclosing 30,000 kVA of transformers. In addition the entire substation site is fenced in and guarded.

Three Sets for Grand Coulee

Mr. H. Ickes, the United States Secretary of the Interior, has ordered three 150,000-HP turbines to complete the installation in the west power house of the Grand Coulee Dam. Arrangements have been completed to begin at once the construction of a twin power house on the east side of the river where nine more sets will eventually raise the capacity of the project to 2,700,000 HP.

Remember: Waste Paper is War Material

Municipal Supply Matters

Recent I.M.E.A. Activities

BY the time these notes appear the Incorporated Municipal Electrical Association will have moved into its new London headquarters at Wellington House, 125-130, Strand, W.C.2. The old telephone number (Temple Bar 1882) has been retained.

Arrangement with Central Board

For some time past the I.M.E.A.'s Generation Committee (chairman, Mr. J. Mould) has been considering the proposals for a wartime arrangement with the Central Electricity Board with a view to reimbursing the Board for financial losses sustained by reason of the lower thermal effciency of stations operated under its direction. The cause of the deterioration is the adverse operating conditions arising from the meeting of wartime requirements. The protection of generating station owners against certain losses caused by damage to or destruction of their stations has also been under consideration.

The matter is being studied by the Association with other supply associations and the terms of a proposed Statutory Order embodying the suggestions is also being considered.

Financial Control

The Association has consistently stressed the undesirability of placing the control of the finances of undertakings under any official other than the general manager or electrical engineer. At Luton recently the Town Council considered and adopted a report from a special committee the trend of which was adverse to this view whereupon the chairman of the Town Council's Electricity and Transport Committee resigned in protest.

The *I.M.E.A. Journal* reiterates the opinion that it is generally not in the interests of sound commercial practice for the financial side of the undertaking to be delegated to an officer other than the one in charge of, and responsible for, that undertaking.

War Damage

Representatives of the Joint Committee of Electricity Supply Associations have interviewed the Treasury and other Government Departments upon various points relating to war damage to public utility undertakings, with a view to ensuring that these points will be covered when consideration is given to the projected Bill dealing with the matter.

Clear Lamp Prices

It has hitherto been the policy of the Electric Lamp Manufacturers' Association to encourage the use of internally-frosted (pearl) lamps by charging a little more for the clear-glass equivalents. Now E.L.M.A. has notified the I.M.E.A. that as from February 9th the charges for clear lamps will be the same as for pearl in the 15, 25, 40, 60, 75 and 100 W sizes (Group I—General Lighting Service). This temporary measure is taken on account of the shortage of pearling acid for internal frosting.

Dilution of Labour

Agreements in the Electrical Industry

WHILE the trade unions have agreed that wartime conditions must involve the relaxation of existing practices, they are anxious to preserve the rights and privileges which they have gained in the past. Accordingly rules are drawn up to govern the conditions of entry of men and women into industry as a temporary wartime measure. An agreement has been made on these lines by the National Joint Industrial Council for the Electrical Contracting Industry and has been circulated to his members by Mr. L. C. Penwill, Director of the Electrical Contractors' Association.

This provides that electrical contractors may employ workers other than those normally engaged in contracting work or semi-skilled or unskilled male and female labour under arrangements to be made by District Joint Industrial Councils or accredited representatives of the National Federated Electrical Association and the Electrical Trades Union. Men or women employed on skilled work under such arrangements are to be paid the skilled electricians' rate while those employed to assist on electricians' work under skilled supervision will be paid 75 per cent. of that rate. In all cases the "dilutees" will come under the electricians' conditions and disputes will be settled in accordance with Clause 19 of the National Working Rules.

A record of all changes of practice and of all "dilutees" is to be kept on the site by the employers for inspection at any time by the local official of the E.T.U. and copies are to be provided for the Union and the N.F.E.A. At all times skilled electricians are to be given preference over "dilutees" on skilled electricians' work.

As regards the employment of women, it is provided that the minimum age of entry shall be 18 and from this age up to 21 they shall be paid at the following rates :—18-19, 10¼d. per hour; 19-20, 10¾d. per hour; 20-21, 11¼d. per hour. Adult women workers must serve a probationary period of six months during which they will be paid 90 per cent. of the men's rate. After this women who are able to carry out the same work as the men they replace, without additional supervision or assistance, will be paid the rates fixed for the men of the same grade.

Electricity Supply Industry

An agreement in similar terms has been approved by the National Joint Industrial Council for the Electricity Supply Industry. In this agreement, however, arrangements are made with regard to "up-graded" workers. It provides that if any employee has been up-graded to take the place of a skilled man who has been called up for war service or transferred to some other employment, then on the return of this skilled employee to the undertaking the employee who has been temporarily up-graded shall be re-instated in a grade not less favourable to him than that which he occupied before.

Post-War Planning

Public Utilities' Views

From a Correspondent

A MEMORANDUM has been submitted by the Conjoint Conference of Public Utility Associations to the Expert Committee on Compensation and Betterment.

This Committee is presided over by Mr. Justice Uthwatt, the other members being Mr. James Barr, vice-president of the Chartered Surveyors' Institution, Mr. Gerald Eve, a past-president of that Institution, Mr. F. R. Evershed, K.C., and Mr. James Wylie, C.B.E., barrister-at-law.

The terms of reference to the Committee, which was appointed by Lord Reith, then Minister of Works and Buildings, were to make an objective analysis of the subject of the payment of compensation and recovery of betterment in respect of public control of the use of land ; to advise what steps should be taken now or before the end of the war to prevent the work of reconstruction thereafter being prejudiced, and in this connection to consider (*a*) possible means of stabilising the value of land required for development or redevelopment, and (*b*) any extension or modification of powers to enable such land to be acquired by the public on an equitable basis.

Committee's Interim Report

The interim report of the Committee was issued in July, 1941 (Cmd. 6291, price 3d.). It was based upon certain principles laid down by the Minister which are summarised as follows:—(1) That the principle of planning will be accepted as national policy and that some central planning authority would be required. (2) That this authority will proceed on a positive policy for such matters as agriculture, industrial development and transport. (3) That some services will require treatment on a national basis, some regionally and some locally.

The interim recommendations of the Committee are summarised in two parts:—

Part i—Dealings in Landed Property—

(*a*) Compensation not to exceed sums based on "pre-war values," *i.e.*, values at March 31st, 1939.

(*b*) Regard to be had to the site value at March 31st, 1939, claimed or arrived at in connection with the assessment of compensation under the War Damage Act, 1941.

Part ii—Control of Building Operations and other Developments pending Reconstruction.—It is assumed that power to control building and other developments will be vested in the Central Planning Authority which will be guided by national planning considerations. This Authority will be empowered to delegate its powers to local authorities. Each licence to carry out work should state whether or not, in the event of subsequent public acquisition or control of the land upon which the work is done, the new works or the injury to any business carried on upon the land will rank for compensation.

The interim report recommends that control shall be exercised over undeveloped land and provides for reconstruction schemes to be made in respect of developed land. Where developed land has suffered extensive war damage it may be considered suitable for redevelopment as a whole or for acquisition for any purpose for which the competent authority may be authorised to acquire land compulsorily.

Importance of Utility Services

The above-mentioned memorandum of the Conjoint Conference is naturally directed to the deliberations which will be undertaken by the Committee subsequently to the publication of its interim report. The attention of the Committee is directed to the importance of the part played by the electricity, gas and water industries in the life of the nation today, not only by reason of the fact that they represent more than £1,000,000,000 of capital and employ over a quarter of million persons, but still more because no community could exist without a public supply of water, light, heat and power. From this it follows that all questions relating to social prosperity, social welfare, industrial and agricultural development, coal conservation, and planning are of the greatest interest to the utilities.

It is emphasised that all matters such as the location of population, transport, housing, the siting of factories, and the development of agriculture which must come within the purview of the Central Planning Authority must be of vital concern to the utilities which have their part to play in all these matters.

It is therefore essential in the view of the Conference that each of the utilities should be represented on the Central Planning Authority. Special attention is called to the statement of the Minister that "some services require treatment on a national basis, some regional, and some local." It is pointed out that the areas in which many utilities operate do not coincide with any local or regional boundaries.

With regard to compensation and better-

ment the memorandum of the Conjoint Conference is divided into three sections, *viz.*:—(1) General considerations; (2) the special position of public utilities as owners of land; and (3) the special position of public utilities other than as owners of land.

1. *General Considerations.*—It is considered important that the term " undeveloped land " should be clearly defined and the definition contained in the Finance Act, 1910, is approved. This definition is as follows: " Land which has not been developed by the erection of dwelling houses or of buildings for the purposes of any business, trade, or industry other than agriculture, or is not otherwise used for any business, trade or industry other than agriculture."

It is emphasised, however, that if a road has been made and sewered and the mains and cables of the utilities have already been laid thereunder, then it would be difficult to define this land or land immediately abutting on it as " undeveloped." Even though no buildings had been erected, the mere fact that such mains and cables had been laid enhances the value of the land. The memorandum states that the " Robinson Scheme " will not be sufficient to meet the case of the utilities which will require compensation to be paid to them in a capacity other than that of landowners.

The " Robinson Scheme " is described in the Report of the Royal Commission on the Distribution of the Industrial Population. In paragraph 252 of this report it is suggested that the value of the development rights to be purchased by the " National Development Board " would be the difference between the value of the undeveloped land for its existing use, or other use not involving development, and its value for development purposes. The value of the development rights over the whole country was to be assessed as a single operation, as was provided for in the case of property in coal by the Coal Mines Act, 1938, and a " global " amount of compensation determined.

Control of Land

2. *Public Utilities as Owners of Land.*—Generally speaking, the rights of utilities to acquire and hold land are governed by Parliament, and it is essential that control over such land should be retained by the utilities. The Conference does not claim that such lands should be excluded from the category of " undeveloped land " in that undertakers should claim their share of the " global " sum. It is, however, suggested that the development rights of the land should be assessed but no money should be paid to the undertaker concerned unless and until the land was about to be developed.

3. *Special position of the utilities other than as owners of land.*—It is contended that an undertaking should receive compensation if as the result of planning a substantial proportion of its consumers are removed outside its area. In such cases capital assets rendered redundant as well as loss of revenue would require to receive consideration. Another case for compensation would arise where a utility had increased or enlarged its manufacturing plant in anticipation of a development which, apart from planning, would inevitably have taken place.

The above is a brief summary of the memorandum of the Conjoint Conference. It seems desirable to point out that in addition to the Uthwatt Committee, the Government has appointed another Committee under Lord Justice Scott, the purpose of which is to deal with such matters as the maintenance of agriculture, the location of industry, and the preservation of rural amenities. The Conference has submitted a further memorandum to this Committee.

Indian Electrical Inventions

WHILE the annual report for 1940 of the Patent Office in India (abstracted in *Indian Engineering*) shows that there was a substantial increase in indigenous applications relating to many industries, a considerable falling-off is recorded in electrical inventions. As in previous years the art of illumination received the greatest attention from inventors and accounted for nearly half the total number of applications received in respect of the electrical industry. There was fair increase in the number of applications relating to supply circuits, but those for heating devices and switches were much fewer.

A large number of applications dealt with methods for improving the quality of light given by discharge lamps by the use of fluorescent materials, and with circuit elements for operating discharge devices, so as to enable the lamp to be operated from customary sources of domestic supply. The provision of means for facilitating the starting of the lamp and obtaining a stable discharge consuming less power was another of the objects which the inventors had in view. Attention was also given to incandescent filament lamps, especially improved methods for sealing conductors into the lamp envelopes and the provision of improved caps and sockets for the lamps.

Inventive activity was also directed towards improvements of supply installations suitable for operating high-pressure mercury vapour discharge lamps and towards improved methods of preparing insulated ignition cables for use in internal combustion engines. Most of the applications relating to wireless signalling were concerned with frequency selective circuit arrangements and valve amplifiers for high-frequency signals. Antennæ systems for directive purposes and couplings to prevent intermodulation of signals and carrier-wave transmission systems also received some attention. There was a slight fall in the number of applications in the field of telephony. Selector repeater switches for setting up connections in exchanges and apparatus for automatically printing information concerning calls were some of the objects. An increase was noticeable in television applications.

Estimating Raid Effects

"Damage Proneness Numbers"

PRONENESS to damage of plant through enemy action was the subject of a paper by Mr. Hal Gutteridge (consultant) submitted to the INSTITUTION OF MECHANICAL ENGINEERS in London on February 27th.

His aim was to draw attention to ways and means underlying the rapid approximate estimation of damage to factory equipment, which would be affected to greater or less extent depending upon its type and degree of exposure. Thus the author suggested that all plant could be classified beforehand within probable limits of extent of damage, so that trained observers could allot "damage proneness numbers" to each class. Expressed as a percentage of the value of the item, the d.p.n. would indicate the amount of the loss involved, and the sum of the individual losses would represent the total loss, leaving only exceptional cases outside the average limits. For example, delicate electrical apparatus was likely to suffer severely if subjected to blast, collapse of building housing it, falling debris, or flooding; its d.p.n. was likely to be between 80 and 100 in average cases, excluding direct bomb hits and persistent fire.

In contrast to this, the d.p.n. of electric motors ranged from 50 to 80, since they were somewhat protected by their strong body casing and their high ratio of weight to exposed area because of secure fastening to their bases. Even so, it was a frequent experience to find their feet fractured and the machine dislodged. Cables were said to be particularly vulnerable; if attached to structural members, total collapse of the building would make their d.p.n. approach 100, whereas if placed underground and spaced far enough apart it might be between 40 and 80, since they would then not all be affected to the same extent.

Public Address Systems

THE history and development of systems for the amplification and distribution of speech and music are traced in the paper by Mr. S. Hill (Standard Telephones & Cables, Ltd.), submitted to the Wireless Section of the INSTITUTION OF ELECTRICAL ENGINEERS in London on March 4th.

Although analogous to telephony, "public address" presents many widely divergent problems, particularly in the design and positioning of the several elements as well as in reinforcing the original sounds for diffusion. Various kinds of microphones with associated amplifiers and loudspeakers used in the past are described in order to reveal their advantages and disadvantages according to present-day knowledge.

In indicating how control of acoustics in auditoria needs co-operation between architects and sound engineers in their design, the author suggests how to plan public address installations so as to overcome defects in the design of auditoria which cause reflection and reverberation; he also shows how these troubles can be overcome in outside broadcasts by the proper placing of subsidiary loudspeakers.

"Time delay" is discussed at length and proposals are made for producing the normal result of distance without unwanted echo effects. Means are also described of artifically producing "time delay" when desired.

Consideration is given to the intensity necessary to overcome the noises caused by the audience in confined spaces, and wind noise in the open air. Auditory perspective by "stereoscopic" means, which requires the highest possible fidelity of reproduction, is briefly described, and the paper concludes with descriptions of three installations as typical examples of the employment of the principles advocated.

Widening Application

The public address system is to-day finding an increasing field of application and is widely accepted as a necessary public service. The existence of such a service is increasingly taken into account in the organisation of all kinds of public gatherings and in the design of public halls. Although individual manufacturers have necessarily achieved a large measure of standardisation of equipment, there has been but little in the industry as a whole. One reason for this is the wide variety of problems which have to be solved.

Many installations are planned for but a single outstanding occasion where difficulties are peculiar to the particular site, the material to be diffused or the size of the audience. The basic principles are fixed, but in the present state of the art it is not possible except in a few simple cases to determine a unique solution of each problem: different engineers may arrive at widely varied but equally acceptable solutions. It may be expected, however, that increasing use of public address systems may lead to a generally acceptable standard of practice and to an even higher standard of performance.

New Zealand Electrical Imports

DURING September New Zealand's imports of electrical apparatus were valued at £135,031. The principal item was £35,096 for insulated cable and wire of which £18,583 was credited to Great Britain and £13,785 to Canada. Electric motors were valued at £18,326 (Great Britain £13,652), and electric ranges at £1,989. Of £4,269 worth of electric lamps Great Britain supplied £2,999. Imports of radio apparatus were valued at £21,743; valves from the United States (£13,850) were the principal item. Only 17 complete sets of a value of £78 were purchased from overseas.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Staff Men's Claim Fails

WITH reference to your report under this heading of the recent decision of the National Arbitration Tribunal in respect to the claim made against the Grampian Electricity Supply Co. by this Association, may I refer to the unanimous resolution of the engineers concerned in the claim, *viz.*:

"That although the National Arbitration Tribunal decision was adverse to the principal claim, the members concerned appreciated that the action taken by the Association has materially improved their salary rates and brought them additional benefits which justify the proceedings taken."

It will be appreciated from this expression of opinion that despite the technical loss, the claimants have received substantial benefits as a result of the action taken.

*London, S.W.*1. W. ARTHUR JONES,
General Secretary,
Electrical Power Engineers' Association.

I.E.E. Members' Status

THE Institution of Electrical Engineers exists, rightly, for the advancement of, and dissemination of, knowledge, but has not the time now come for it to endeavour to secure adequate remuneration for the services of its members, if only because the majority of them are employed by commercial concerns?

Another important matter is that a Graduate cannot become an A.M.I.E.E. until he has had years of experience in a "responsible" position; yet it is very difficult for him to obtain a position of responsibility until he has become an A.M.I.E.E.—a vicious circle which advertisements for many positions perpetuate. Although the Institution does not hold itself responsible for the standard attributed by commercial firms to the various grades of membership, many junior members feel that this attitude does not further its aims and objects.

Architects, doctors, solicitors, surveyors, may all become fully qualified at the early age of 21, their five years or so of training consisting of adequate amounts of theory and practice. I would suggest that methods of training leading to electrical qualifications should be more directly controlled by the I.E.E. in the following two ways. The first is the adoption of the same three-year day course at every university or college. The syllabus would be decided by an Education Committee of the I.E.E. and would be subject to annual revision in accordance with general engineering progress. One degree, to be known as B.E.E. (Bachelor of Electrical Engineering), could be awarded by all universities.

The associate membership examination might be revised and brought into line with the bachelor's degree examination. Student membership should entail the passing of a preliminary examination of matriculation standard and the A.M.I.E.E. examination could be taken at non-university colleges in lieu of the normal college diploma. At the end of the three years, students obtaining a degree or passing the A.M.I.E.E. examination could be elected to graduateship, provided they were prepared to complete the practical part of the course at a recognised works or in the office of a qualified consulting engineer. At the end of a two-year period the Graduate, provided he had carried out his duties satisfactorily, should be able successfully to apply for admission to the class of Associate Members.

Many young men, however, prefer to follow a five-year apprenticeship course with a large engineering firm, attending lectures during certain afternoons and evenings. The second way referred to would enable a modified A.M.I.E.E. examination to be taken at the end of the apprenticeship course, the student then applying for direct admission into the Associate Membership class. Full membership might entail passing a further examination consisting of, say, two papers in a specialised subject, such as "Electric Traction," "Illumination" or "Meters and Instruments," together with proof of, say, five years' practical experience in a responsible position.

Bath GRADUATE.

Advance Payment of Fixed Charges

MOST power companies demand a payment of the primary fixed charges of their domestic two-part tariff in advance. No interest is paid on such an advance payment which is held by the power company in perpetuity or as long as the consumer chooses to stay on a two-part tariff.

This appears to be at variance with the provisions of Sections 27 and 71 of the Schedule to the Electric Lighting (Clauses) Act, 1899, under which a deposit is obtained by the supply company and interest paid on this deposit. I feel that the matter is of some public interest as large sums of money are undoubtedly held by the supply companies as advance payment for the fixed charge, and I should be glad to hear your readers' opinions on the subject.

*Kensington, W.*14. L. A. FERNEY.

PERSONAL and SOCIAL

News of Men and Women of the Industry

FURTHER changes in the directorates of the Edmundson group of companies are announced. Mr. E. F. Dadson has resigned from the board of the Shropshire, Worcestershire and Staffordshire Electric Power Co., and Messrs. H. Towers, A. M. Scott and E. C. Mekie have been appointed directors of the company. Mr. Dadson joins the board of the South Wales Electric Power Co., to which Sir Geoffrey Cox and Mr. Towers have also been appointed. Mr. E. C. Mekie becomes a director of the Cornwall Electric Power Co.

Mr. P. L. Weir, station superintendent of the Portsmouth undertaking has assumed office as president of the Electrical Power Engineers' Association. Mr. Weir was to have occupied the position for the past year but was prevented by his duties from doing so and was therefore designated president-elect.

Mr. P. L. Weir

Mr. R. D. Reynolds, managing director of the Dublin United Transport Co., has been appointed chairman of the co-ordinated transport services of Eire, which include for the duration of the present emergency the Great Southern Railways Co. According to the *Passenger Transport Journal*, the task of the new chairman, who will retain his position of managing director of the Dublin Co., is the reorganisation of rail, road and water transport under the present control of the railway company.

It was recently recommended that the salary of **Mr. F. C. Edmondson,** general manager of the Perth (Western Australia) Electricity and Gas Department, should be raised from £1,750 to £2,000 per annum. The Electricity and Gas Committee reported that in 1927 when the Department's revenue was £327,000 the salary for the position was £2,000 and that it was increased to £2,500 in 1928.

Mr. A. Goward, A.M.I.E.E., has been recommended for appointment as borough electrical engineer of Accrington, in succession to Mr. A. W. Clegg, at a commencing salary of £850 rising to £925 per annum. Accrington Corporation was recently " black-listed " by the Associated Municipal Electrical Engineers and the Electrical Power Engineers' Association because the commencing salary offered was stated to be £358 below the appropriate N.J.B. schedule figure. Nevertheless there were fourteen applications for the post and Mr. Goward was selected from a short list of five.

Mr. Goward has served Accrington electricity undertaking for thirty-one years and since Mr. Clegg's retirement he has been acting engineer. For three years he was attached to the engineering school at the Harris Institute, Preston. Then he spent three years with Blackburn electricity undertaking and went to Accrington as switchboard attendant. Later he was promoted charge engineer, and in 1915 became station superintendent. For twelve years he has been on the District Joint Board of Employers and Members of Staff.

Mr. J. M. Bayle has resigned from the board of **Engineering Components, Ltd.**

Mr. A. S. Plowman has been appointed lecturer in charge of the Department of Electrical Engineering at Sydney Technical College. For many years Mr. Plowman has been head of the Electrical Engineering Department of the Newcastle (N.S.W.) Technical College.

Mr. C. H. Rudd, A.M.I.E.E., A.M.I.Mech.E., has been released from his position of power station superintendent with the Heston and Isleworth Corporation Electricity Department, which he has held for the past four years, to take up a commission in the R.N.V.R.

Mr. Matthew Cable, who was to retire on January 21st from the position of general manager of the Wellington (N.Z.) Tramways and Electricity Department, was thanked for his thirty-five years' service at a recent meeting of the City Council.

Mr. G. Hedley Davis, Associate I.E.E., has relinquished his appointment as commercial manager in the Islington Electricity Department and was recently presented with a pair of inscribed old English pewter tankards, from his colleagues. Mr. Davis has been at Islington for five years. Before that he was with Newport (Mon.), Sheffield and Birmingham electricity undertakings.

Obituary

Mr. D. McLagan.—We regret to record the death on February 19th, in his 67th year, of Mr. Donald McLagan, which occurred at his home in New York, U.S.A. Mr. McLagan was for some years in the service of the General Electric Co., Ltd., which he joined in 1891. He occupied a number of important positions both in the London office and works of the company for about twenty years, during which time he also visited Canada on two occasions for the G.E.C. Though for the last thirty years Mr. McLagan had been in business in New York, he continued his association with the G.E.C. as purchasing agent.

Mr. W. S. Murray.—The death is reported from New York of Mr. William S. Murray, chairman of Murray & Flood, Inc., consulting engineers. Mr. Murray was responsible for the electrification of the New York, New Haven and Hartford Railroad which was commenced in 1905 and completed in 1917.

The Earl of Selborne, whose death occurred on February 26th at the age of 82 was a director of the Telegraph Construction & Maintenance Co., Ltd.

Will.—**Mr. F. L. Bland,** a director of the East Anglian Electric Supply Co., Ltd., left £23,808 with net personalty £8,862.

IN THE COURTS

Compensation Confirmed. Important Street Lighting Decision.

Appeal Dismissed

AN appeal by Murex, Ltd., of Rainham, Essex, against a judgment given by Mr. Justice Hilbery, who in the King's Bench Division last July awarded £1,250 damages to Mr. David Byford Dawson, of Northdown Estate, Cranham, near Upminster, was dismissed by the Master of the Rolls (Sir Wilfrid Greene) and Lords Justices MacKinnon and Goddard in the High Court of Appeal last week.

Mr. Dawson had claimed in respect of injuries he received on June 17th, 1940. His case was that he was a maintenance electrician employed at the works of Murex, Ltd., at Rainham and that he had entered the copper plant when he was struck by a steel tray which fell from chains connected to an overhead electric crane carrying it. A fellow-workman with him was killed. It was stated that Mr. Dawson's back was fractured and he also suffered from a scalp wound and concussion with the result that he was incapacitated and seriously disabled. Murex, Ltd., denied negligence or breach of duty and also pleaded that if there was any negligence it was the negligence of men in common employment with Mr. Dawson. Mr. Justice Hilbery held that breach of statutory duty had been established and awarded Mr. Dawson £1,250. The company now challenged the decision.

Giving judgment dismissing the appeal, the Master of the Rolls said that after the most careful consideration he had come to the conclusion that the balance of probability was in favour of Mr. Dawson's allegation that one of the causes of the accident was the condition of the tackle. He did not think he could interfere with the conclusion of Mr. Justice Hilbery which was one he would have come to himself. The tackle in question which did not comply with the Factories Act was being used under the eye of a supervisor.

Lord Justice MacKinnon, concurring, thought that the makeshift set of chains being used was a piece of apparatus which did not satisfy the requirements of the Factories Act. While it was being used a tray fell and Mr. Dawson was severely injured. In his view Mr. Justice Hilbery was not only justified but was right in holding that Mr. Dawson had proved his case.

Lord Justice Goddard agreed and the appeal by Murex, Ltd., was dismissed with costs. The company was refused leave to appeal to the House of Lords.

Street Lighting Judgment

In the King's Bench Division on February 25th, Mr. Justice Cassels concluded the hearing of an action by the Egham & Staines Electricity Co., Ltd., against the Egham Urban District Council to recover the sum of £3,590 in respect of the provision and maintenance of electricity, standards and lamps, etc., required for the lighting of the streets.

Mr. Wallington, K.C., for the plaintiffs, said the action raised some interesting points of construction under three agreements for the supplying of electricity, standards, etc., to the defendant Council. The plaintiffs undertook to maintain the necessary plant and supply the electricity. Plaintiffs had supplied the electrical energy and their short case was that the defendants had failed to pay anything, except for danger signs.

The defence turned on the three agreements and relied upon certain terms in them and contended that the defendants were released from liability to pay the full sum by reason of the termination of street lighting brought about by war regulations.

His Lordship, in giving judgment, said the plaintiffs undertook to supply the defendants with lighting, to maintain the lamps and to do repairs, renewals, etc. There were three agreements, the first in October, 1933, for five years, the second made in 1935 for fifteen years, with a stated price, and the third was in 1937 for five years for certain lamps. In 1939 street lighting was prohibited, except as to danger signs. The plaintiffs now claimed for lighting after that period. The defendants pleaded that they were entitled to a rebate which exceeded the amount claimed. Plaintiffs said they had fulfilled their part of the contracts, supplying electricity to the switches and lamps, and the supply could be resumed at once. The defendants relied on one of the clauses of the agreement and said that it excused payment of the money claimed. The case was a matter of importance to both parties. The contracts were very plain. Clause 15, the default clause, did not afford the defendants any defence. Lighting restrictions had not prevented the plaintiffs from performing their part of the contract. The plaintiffs were entitled to succeed and he gave judgment for plaintiffs for £3,590 with costs. His lordship hoped that some arrangement would be come to to relieve the defendants of some part of their liability under the contracts. Mr. Wallington said that negotiations were proceeding.

Leave to appeal was granted.

Examiners Charged

At Hebburn Police Court on February 23rd, James Etchells (65), of Cumberland Park, Acton, was sent to prison for six months and John Heywood (27), of Fulwell Road, Sunderland, was fined £10 and ordered to pay £10 costs on charges of falsification of accounts and obtaining money by false pretences. It was stated that the accused were Ministry of Supply examiners attached to the works of A. Reyrolle & Co. There were three charges against each of the accused of falsification of time sheets. Heywood pleaded guilty to actual intent and Etchells not guilty.

Etchells, in defence, said that the works were on holiday and he regarded it as his holiday but as he worked he put in 27¼ more hours as he considered that he was entitled to double pay. Heywood, in evidence, said he showed his first time sheet to Etchells who asked why he had not booked in the Sunday and Monday. Witness replied that he was not there, and Etchells said "What does it matter?"

Evidence was given that Etchells had previous convictions.

COMMERCE and INDUSTRY

Payment of Called-up Employees. Paper-saving Results.

War Risks Insurance

THE Board of Trade, with the Treasury's approval, has decided that in respect of the period beginnning March 3rd, and ending June 2nd, the rate of premium payable under any policy of insurance issued under the Commodity Insurance Scheme shall continue to be at the rate of 7s. 6d. per cent. per month.

Fair Trading

The secretary of the Electrical Fair Trading Council (Mr. Felix A. Rogers) says that thirteen bodies are now separately and directly represented on the Council. The following have recently become members:—B.E.A.M.A. Accessories Section; B.E.A.M.A. Heating, Cooking and Domestic Appliances Section; the British Synchronous Clock Conference; the Domestic Electric Refrigeration Association; and the Electric Water Heater Manufacturers' Association.

Rubber Cables in Australia

In order to conserve the limited stocks of rubber-insulated cable in Australia, the Commonwealth Ministry of Munitions recently requested those concerned to consider the use of locally-manufactured triple-braided and red-lead impregnated aerial cable as a substitute. Supply authorities were asked to minimise internal wiring by putting service points in suitable positions. Replacement of wiring should be avoided where repair was possible and only the minimum of new cable should be used. It was also suggested that 250-V grade rubber-insulated cable should be permitted until adequate supplies of 660-V cable were procurable, where the pressure to earth does not exceed 350 V; special care should be taken to ensure proper support and fixing of conduit runs.

After other suggestions aimed at reducing the quantity of rubber cable to be used, the Ministry said that while the shortage persisted campaigns aimed at selling more equipment (except for industrial purposes) should be suspended.

London J.E.A. Proposals

At yesterday's (Thursday's) meeting the London and Home Counties Joint Electricity Authority was to consider a recommendation of its General Purposes Committee extending to women employees who are called upon to join the three women's services the benefits already accorded to male employees. That is, the Authority will grant them leave of absence and make up their service pay and allowances to their "civilian" level.

It was also recommended that employees directed by the Ministry of Labour to take up work of national importance, otherwise than with the armed forces, should be granted leave of absence without any payment by the Authority.

The Committee was to report on the receipt of an application from the N.A.L.G.O. for the adoption by the Authority of the scale of cost-of-living additions approved by the London District Council for local authorities' administrative, technical and clerical services in substitution for that now operated by the Authority. It was recommended that the application should not be acceded to.

The Local Distribution Committee reported that the annual contracts for the supply of cable expired at the end of March. During the past year only small quantities were purchased and these conditions were expected to prevail during the current year. The Committee had therefore authorised negotiations for the renewal of existing contracts which contain the usual provisions for variations in respect of the cost of labour and material.

Limitation of Supplies Booklet

Full details of the operation of the Limitation of Supplies (Miscellaneous) (No. 13) Order, 1941, are given in convenient and understandable form in a booklet just issued by the Board of Trade ("General Merchandise Quotas," Stationery Office, 3d.). It explains the reasons for limiting the home sales of certain non-essential goods as well as articles which, though necessary, can be more economically used. There has been no drastic alteration in the schedules of controlled goods recently. So far as the electrical industry is concerned the only amendment has been the transfer of electrically heated pads and blankets from Class 6 to Class 17; the quota remains the same.

Circumstances in which controlled goods may be supplied without restriction are set out and other matters covered are the replacement of bombed goods, advance schemes for co-operation among retailers, arrangements with regard to composite businesses, the dispersal of stocks to reduce risk of loss, methods of calculating value, and records and returns. A concise list of controlled goods and an index of controlled and non-controlled goods are also included.

Paper Salvage Prizes

The results of the paper salvage contest, which ran throughout January, between local authorities in Great Britain were announced this week. There were twenty areas and six prizes were awarded in each, the first prize being £500. The prize money goes in the authorities' names to Red Cross, the Forces' benevolent funds and local charities. The results were assessed on a *per capita* basis so that both large and small areas stood an equal chance.

While the competition has undoubtedly created great public interest and brought in 100,000 tons of waste paper there is no excuse for any relaxation of effort; interest must be sustained and the flow of waste paper back to the mills be kept going in the greatest possible volume. We once again appeal to our readers to do all that they can in this direction. It may not be generally realised that allocation of paper to journals such as this has recently been subjected to another cut. All of us

have had to " reduce "; we note that the latest journal affected is " B.T.H. Activities," which draws attention to its reduction in matter owing to the paper situation.

Helping the Farmer

It is pointed out to us that from the article entitled " Helping the Farmer " in our February 20th issue, some readers may have assumed that the S.W. & S. Electric Power Co. carries out the whole of the internal wiring and installation work required in its area, and also supplies all the necessary equipment. This, of course, is not the case. At Capt. J. F. Bomford's Spring Hill Farm, for instance, all the equipment was supplied and installed by the local electrical contractors, Abell & Smith's Electrical Co., Ltd.

Boys Damage Plant

When four boys whose ages ranged from nine to twelve years were summoned recently at Blaina for damaging transformer and switch insulators belonging to the South Wales Power Co. to the extent of £28, Mr. H. Saunders stated that there was a good deal of similar damage in the area. As a result of the offences 1,250 consumers were without supplies. Nantyglo and Blaina Hospital had on one occasion been cut off. The boys were bound over and their parents ordered to pay 10s. costs each.

Power Station Fatality

Giving evidence at the inquest on Louis Peter Joseph Mages, aged fifty-two, labourer, who was fatally burned by a flame which shot up 100 ft. from a boiler to the roof of the Tir John power station where he was working, Mr. H. E. Blackiston, borough electrical engineer and manager of Swansea, said he was of the opinion that the flame was caused by the ignition of gas released as the result of the incomplete combustion of the pulverised fuel in the boiler. He had never heard of a similar incident elsewhere. A verdict was recorded of " Death in accordance with the medical evidence, possibly caused in the manner suggested."

The I.E.S. Code

A new edition of the Recommended Values of Illumination issued by the Illuminating Engineering Society (the " I.E.S. Code "), containing certain modifications and additions, including values of illumination for the various textile processes, has now been issued. Copies (8d. each, 9d. post free) are obtainable on application to the Illuminating Engineering Society, 32, Victoria Street, London, S.W.1.

American Appliance Sales

The January issue of *Electrical Merchandising* (New York) contains the customary review of sales of domestic electrical appliances throughout the United States during the past year. This shows that in value electric refrigerators occupied the first place. The number sold was 3.5 million and their value $542·5 million as compared with 2·6 million valued at $395·2 million in 1940. Next in order came radio receivers of which 13·7 million ($415·8 million) were sold, against 11·5 million ($347·8 million) in 1940. Lighting was third; 1,350 million lamps of all types were sold and their value is given as $238·7 million as compared with 1,115 million ($176·5 million) in 1940. Washing machines numbered 1·9 million and their cost was $148·6 million (1·5 million valued at $104·0 million in 1940). The fifth position was occupied by ranges which numbered 728,000 with a value of $103·4 million; in 1940 450,000 valued at $62·8 million were sold.

The degree of " saturation " for the principal appliances is given as follows:—Irons, 95·5 per cent.; refrigerators, 72.0 per cent.; washers, 63·1 per cent.; toasters, 59.4 per cent.; floor cleaners, 49·7 per cent.; percolators, 36·2 per cent.; ranges, 12·6 per cent.; and ironers 7·0 per cent.

A Just-So Story

A clever skit on the B.B.C. " Brains Trust " is included in the February *Contact* (the staff journal of Central London Electricity, Ltd.). In the course of this, one of the members of the Trust, " Lord Billingham," remarks:—" I believe I am right in saying that it was early last century when Michael Faraday was a boy that he carried out his famous experiment of rubbing the family cat with his fountain pen. Two electric charges were produced—one on the cat and one on the pen. The cat immediately bolted, carrying with it the electric current, or running charge, and Faraday was left holding his fountain pen with the static or standing charge. These two charges, the running and the standing charge, form the basis of tariffs to this day. It was not until some fifty years later that electricity began to be available to the public and even then for some considerable time its progress was slow as undertakings were run chiefly by engineers, who, as everyone knows, are almost devoid of business acumen. Of late years the industry has flourished and the general realisation of its pecuniary possibilities coincided with the advent of the salesman, the tariff specialist and other business men."

Birmingham Lighting Conference

Sir Duncan Wilson, former Chief Inspector of Factories and chairman of the National Industrial Electric Lighting Service, was both chairman and question-master at an Industrial Lighting "Brains Trust," held in Birmingham on February 18th, at which 180 people were present, divided almost equally between factory executives and engineers and electrical interests. In his opening remarks Sir Duncan said that it had always been of great concern to him to notice how many manufacturers and workmen were apparently quite indifferent to the lighting conditions in their factories. This was, he believed, especially the case in Birmingham and neighbourhood which contained old factories. Any manufacturer who was doubtful about his lighting could write to the National Industrial Electric Lighting Service, preferably at the local office, and on receipt of the application a qualified lighting engineer would be sent and a scheme drawn up. This would given to the manufacturer and he could then either engage a contractor on his own to carry it out or apply to the Service for a contractor to be sent to him.

Mr. W. A. Bond, H.M. Divisional Inspector of Factories, gave a brief description of the standard of lighting required by the new Lighting Regulations, dealing with the subject chiefly from the welfare and safety aspects.

Mr. R. O. Ackerley said that lighting better than the mandatory minimum was chiefly required either for work which was particularly dangerous or where production must be stimulated. He

briefly outlined the merits of tubular fluorescent lamps, but pointed out that since they were not available in unlimited quantities their use should be restricted to those areas where they would be of greatest advantage to the war effort.

At the conclusion of the introductory addresses Sir Duncan Wilson acted as question-master to a "Brains Trust" consisting of Mr. Bond, Mr. Ackerley, Mr. R. H. Rawll (chairman, Local N.I.E.L.S. Committee), Mr. A. E. Iliffe and Mr. D. W. Tyrrell (Lighting Inspector, Ministry of Supply).

Fuel Economy

The latest "fuel economy" advertisement of Edmundsons Electricity Corporation, Ltd., appearing in approximately a hundred papers in the company's various supply areas, depicts the head of Goebbels as a wall plug with the exhortation: "Pull Out That Fire Plug—It Makes Goebbels Angry When You Do!"

E.D.A. Luncheon and Meeting

The annual luncheon of the British Electrical Development Association is to take place at the Savoy Hotel, London, W.C.2, on Friday, March 20th (12.30 for 1 p.m.). It will, as usual, be followed by the annual meeting at 3 p.m.

Cable-makers' Wages

The Joint Industrial Council for the Electrical Cable Making Industry announces that the cost of living figure on January 31st (100 per cent. above the 1914 level) will not involve any alteration in wages on the third pay-day in March.

Changes of Address

Charles White (London), Ltd., whose premises were damaged by enemy action are now at 13, Little Trinity Lane, Upper Thames Street, London, E.C.4.

The Anglo-Argentine General Electric Co., Ltd. (an associate of the G.E.C.) informs us that its address is now Paseo Colón 669, Buenos Aires.

Dissolution of Partnership

Messrs. J. Jones and A. Sutcliffe, trading as Jones & Sutcliffe, electrical and mechanical engineers, at Electric House, 26, Church Street, Littleborough, have dissolved partnership. Mr. Jones will attend to debts.

Ship Propulsion

Geared steam turbines for 310 propeller shafts, aggregating 8,800,000 HP, have been ordered from the General Electric Co., of America, for the propulsion of battleships and destroyers. During 1941 that company received orders for Diesel-electric equipment, exclusive of machinery for submarines, aggregating nearly three times the horse-power of all such equipment purchased in the United States during the preceding twenty years; 67 vessels are being so equipped with more than 300,000 HP, several of them with AC transmission on account of their larger sizes, only one transmission system of this kind having previously been built by this company.

The Sun Shipbuilding and Dry Dock Co. is building 52 tankers for the U.S. Maritime Commission. They will have G.E. turbo-electric drives, each ship requiring one main 5,400 kW generating set; one 90 RPM motor of 6,000 HP at 2,300 V, three-phase, 60 cycles; two 525 kW and one 50 kW auxiliary turbo-generators; two 115 HP turbines for driving boiler feed water pumps, three 200 kVA "Pyranol" distribution transformers, miscellaneous motors and switchgear.

Propulsion equipment for more than 150 merchant ships was under construction at the end of the year by the G.E. Co., which also supplied during the year more than 10,000 induction motors of various sizes and types with their starters for naval vessels of all kinds, which indicates the growing use of AC auxiliary equipment in ships of the larger designs. Single-phase "Selsyn" transmission systems for steering gear are claimed to be an improvement upon three-phase operation.

New Catalogues and Lists

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Illustrated pamphlets (Nos. 1121 and 1109) containing revised particulars of improved standard types of directional and attracted-armature AC relays.

Bruce Peebles & Co., Ltd., Edinburgh, 5.—Illustrated pamphlet (No. 111) describing the construction and operation of glass bulb mercury vapour rectifiers, single and multi-phase.

Trade Announcement

The business of Locke & Soares, Ltd., electrical engineers and contractors of New Cavendish Street, London, W.1., has now been re-organised and will in future trade as Locke & Soares (1942), Ltd., 6-10, New Cavendish Street, W.1 (telephone: Welbeck 5455-6).

TRADE MARK APPLICATION

THE following application has been made for a British trade mark. Objections may be entered within a month of February 25th:—

LINOTYPE. No. 617,196, Class 9. Thermo-electric elements, electric switches, resistances, coils, connections, conductors, fuses and thermostats.—Linotype & Machinery, Ltd., 9, Kingsway, London, W.C.2.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have the present addresses of the following:—

FILTERAIRE, LTD.

H. E., LTD., makers of TUVEC heaters. Immersion elements marked "A.H.D.72R."

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Limit Switch

THE latest development of the No. 450/100 Palmer crane limit switch by the IGRANIC ELECTRIC CO., LTD., Bedford, is the type P.1 safety limit switch. It satisfies the demand for a limit switch for the smaller types of cranes, which was formerly met by the type P.2 unit, suitable for cranes up to 90 HP at 200/250 V, or 100 HP at 400/550 V.

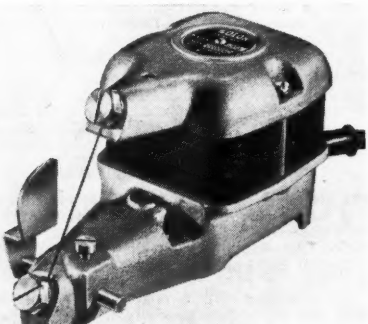
In designing the new switch the opportunity was taken to incorporate the improved heavy steel-mill duty blow-out and a lightweight fabricated sheet-steel housing in place of the heavier cast-iron housing employed for other models.

Limit switch incorporating heavy steel-mill duty blow-out and light fabricated steel housing (cover removed)

Apart from these changes the switch is similar in operation to the No. 450/100 Palmer limit switch in that it prevents damage by over-travel of the hook when hoisting. The crane hoist cable passes through the fork in the reset weight, so that when the crane hook approaches the limit of travel the weight is lifted and a tripping weight operates the switch. When the change-over contacts are operated the motor is disconnected from the supply and connected directly across a resistance, thus establishing dynamic braking and assuring a quick, smooth stop. When the limit switch is in the tripped position a by-pass circuit is established which permits backing-out at low speed.

Cable Stripper

The introduction of an insulation stripping device of an unusual kind is announced by



Electrically heated "Solon" cable stripper

W. T. HENLEY'S TELEGRAPH WORKS CO., LTD., Milton Court, Westcott, Dorking, Surrey.

It is very robustly constructed and designed primarily for the speedy removal of insulation from single-core cable which is rubber insulated, of either the tough-rubber-sheathed or taped and braided varieties. Since this novel machine has no cutting action, the process of uncovering cable cannot damage the conductors, which fact eliminates a disadvantage of mechanical stripping. Instead, the insulating covering is severed by contact with a resistor wire element which operates at a dull red heat.

This "Solon" stripper consists of a transformer with the secondary coil short-circuited by the resistance wire element. Severance is made by revolving the insulated conductors on the heated wire, and the length of insulation to be removed is controlled by an adjustable guide, set according to requirements. Fixing to the bench on assembly lines of radio or electrical instrument and allied trades is simple, for in the base of the stripper are two holes for bolts or screws.

The transformer is suitable for 220/250 V, AC, 50 cycles and is supplied complete with 6 ft. of Henley t.r.s. three-core flexible, with ends trimmed to take a three-pin plug. The brown third core, the earth or grounding wire, is already connected to the metal body. An efficient rubber sleeve cord grip prevents any twisting, or pull, being transmitted to the internal wiring.

Fan-Speed Control

MAGNETIC means of varying the speed of induced-draught fans driven by constant-speed motors are being utilised in America. The Electric Machinery Manufacturing Co. has made for one customer 21 sets for speed ranges up to 10 to 1 in sizes of from 75 to 250 HP. According to *Power*, each is self-contained on its own pedestal bearings and base, flexibly coupled to the driving motor and driven fan.

Electro-magnetic flux linkage is between two elements. The outer member is a "stator ring" consisting of a circular steel backplate to which is clamped a laminated iron core, slotted for a squirrel-cage winding, which is rotated on roller bearings by the driving motor. The inner member, which drives the fan, consists of a steel spider carrying six magnetic poles without damper windings in their faces; the pole windings are connected to collector rings through which DC is conveyed for excitation.

The driven speed relative to that of the driver is determined by the magnetic slip between the two elements, being controlled by the amount of current permitted to flow in the magnet coils by an adjustable rheostat, which thus regulates the torque transmitted from the motor magnetically through the coupling to the fan. The DC excitation is provided by copper-oxide rectifiers that are fed with AC through variable voltage adjustors actuated either manually or by Hagan automatic combustion control equipment.

ELECTRICITY SUPPLY

Dissolution of Mid-Lancs Board. Cooling Tower Accident.

Bexhill.—DECISION TO JOIN ASSOCIATION.—The Electricity Committee has decided to join the Kent & Sussex Bulk Supply Takers' Association, which has for its object an approach to the Central Electricity Board and the Electricity Commissioners regarding the basis of bulk supply charges, having particularly in mind the charges relating to peak loads. The formation of this Association was referred to at a recent meeting of the Dover Electricity Committee, when a recommendation for membership was approved.

Chester.—REBATE AND REDUCTION.—In July, 1940, an increase of 20 per cent. in charges was approved. The Electricity Committee now recommends that this advance shall be reduced to 10 per cent. throughout the Corporation's area of supply, and further that a rebate of 33⅓ per cent. of the last quarterly account for the current financial year shall be allowed to all consumers.

Durham. — "NESCO" VALUATION. — The County Council has been informed that the county valuer has agreed with the North-Eastern Electric Supply Co., Ltd., regarding the apportionment of the cumulo value of the undertaking among the various assessment areas in the county, and when the assessments have been apportioned among the parishes in these areas by agreement with the parties concerned, application will be made to the Rating Appeal Committee at Quarter Sessions for consent to the revised valuations.

Exeter.—OFF-PEAK DISCOUNT CANCELLED.—In view of the increase in the price of coal since the off-peak heating tariff was introduced in 1936 the 15 per cent. discount is being discontinued.

RATE CONTRIBUTION.—The Electricity Committee has decided to contribute £2,500 to the general rate fund.

Harrogate.—MAINS EXTENSIONS.—The Town Council is to spend £1,795 on mains extensions.

London.—DISPOSAL OF RECTIFIERS.—The St. Marylebone Electricity Committee recommends that two 3,000-kW mercury-arc rectifiers which, as a result of the change-over are now redundant, shall be dismantled and disposed of as scrap. They were purchased in 1929 for £17,412, and efforts to sell them have been unsuccessful.

THERMAL STORAGE TARIFF.—The Hackney Electricity Committee recommends that as from April 1st the average price for the thermal storage off-peak heating supply to the Town Hall shall be increased by 0·001d. per kWh for each 1d. per ton increase in the price of coal over the 1938 figure. In the past two years the annual consumption has been 960,000 kWh and it is estimated that the proposal will increase the total charge by approximately £850 a year. The tariff is at present 0·33d./0·2d. per kWh, plus an advance of 25 per cent. The supply to the disinfecting station will also be affected, to the extent of about £100 per annum.

LEWISHAM.—The Emergency Committee is to provide time switches at shelters at a cost of £262, plus an annual hiring charge of £85.

ST. MARYLEBONE.—The Borough Council Electricity Committee has arranged to provide new switchgear, at a cost of £1,000, at the railway premises in Lisson Grove.

Mid-Lancashire.—PROPOSED DISSOLUTION OF ADVISORY BOARD.—A local inquiry is to be held by the Electricity Commissioners at the Town Hall, Preston, at 11.30 a.m. on March 19th in connection with the proposed dissolution of the Mid-Lancashire Electricity Advisory Board. The reasons for this step are set out in a draft order, the Mid-Lancashire Electricity District (Amendment) Order, 1942, and are generally similar to those put forward for the dissolution of the East Midlands Electricity Advisory Board (ELECTRICAL REVIEW, January 2nd, p. 26). Representations or objections should be submitted to the Secretary, Electricity Commission, before March 14th.

Portland.—COOKER WIRING.—At a recent meeting of the Electricity Committee the electrical engineer reported that owing to the difficulty of obtaining underground cable and the prospect of an acute shortage of rubber cables, the Committee should consider whether the whole cost of a service and cooker wiring installation should be paid for by the consumer. The Committee decided that this should be done except where for any special reason the Committee decided otherwise.

Willesden.—COLLAPSE OF COOLING TOWER.—The *Evening News* reports that a 160 ft. cooling tower being built at the Northmet power station, Taylor's Lane, Willesden, collapsed last week. It was at first feared that workmen had been trapped underneath it, but this proved unfounded. It is not known what caused the tower —a steel skeleton which was being covered with concrete—to fall.

Overseas

Australia.—VICTORIAN SCHEME DELAYED.—In the 1940–41 report of the State Electricity Commission of Victoria it is reported that to meet additional demands for defence purposes all new projects are being pushed forward as rapidly as possible. The first section of the Kiewa hydro-electric scheme, which was to have been ready by the winter of 1942, might, however, be delayed due to difficulties in obtaining generating plant. In this case all reserve plant will be needed to meet the anticipated demand, and as part of the scheme to cater for increased industrial loads new 20,000-kVA substations are being constructed. The first of the water tunnels of the Kiewa scheme, almost a mile long and 16 ft. in diameter, was completed in November.

TRANSPORT

Brighton. — TROLLEY-BUS "WARSHIP." — A trolley-bus transformed into the appearance of a battleship was a feature of the town's Warship Week. According to the *Passenger Transport Journal* a very creditable effect was achieved with the aid of scrap timber, calico and fabric finished off with spray and hand painting.

Cardiff.—INAUGURATION OF TROLLEY-BUSES.—It is reported that the Transport Department proposes to inaugurate its first trolley-bus service this month. The route will be from the centre

of the city to Grangetown. A pay-as-you-enter device will be tried out, and no change will be given by the conductors.

Manchester.—TROLLEY-BUSES AND ELECTRIC SHOCK.—The *Manchester Guardian* records that some alarm was caused recently by the story that the city's trolley-buses were taken out of service for two days because passengers and drivers in considerable numbers were receiving electric shocks. Actually the trolley-buses were at no time taken off the routes even for as much as a day, and no case of serious shock was reported. The facts were that on a recent Sunday there was a heavy fall of snow and the trolley-buses ran as usual until about 4.30 p.m., when it was reported that the thick snow and slush had on some of the vehicles created a "bridge" of moisture over the insulating media between the motors and switchgear and the bodies of the vehicles, causing slight short-circuits. According to reports received by the Transport Department some people experienced slight shocks, and the engineers of the Department suggested that the vehicles should be taken off the roads so that they could be thoroughly dried. On Monday morning the trolley-buses were sent out again into the slushy streets and were in service most of the day. During the slack hours some of them were taken to the sheds for drying and other necessary attention. It was stated that even in such highly exceptional weather the risk of serious shock was almost infinitesimal.

RADIO & TELEPHONY

Australia.—COMMUNICATION WITH INDIA.—Senator Ashley, Postmaster General and Minister of Information, announced last week that by arrangement between the Commonwealth and India and Amalgamated Wireless, Ltd., a direct radio link had been established between Australia and India. The charges for the service would be the same as for cables. The P.M.G. also announced that a direct photo-telegram service had been established between Australia and the United States by the direct beam wireless service.—*Reuter* (Canberra).

United States.—RADIO LINK WITH NEW ZEALAND.—Reuter reports from Washington that on the occasion of the inauguration last week of direct radio communication between the United States and New Zealand, President Roosevelt assured Mr. Peter Fraser, New Zealand's Prime Minister, that the United States would "leave nothing undone to achieve our common objective of freeing our world once and for all of the forces of aggression." Mr. Fraser, in reply, voiced the hope that this new link would serve to bind still closer the warm ties and long-standing friendship between the American and New Zealand peoples. It would undoubtedly provide the most valuable means of practical co-operation in the prosecution of the common task whereto both peoples had set their hand.

Forthcoming Events

Institution of Electrical Engineers.—Thursday, March 19th, 6 p.m. "A Critical Review of Education and Training for Engineers," presented by Dr. A. P. M. Fleming, C.B.E., M.Sc., for the Education, Training and Personnel Sub-Committee of the Post-War Planning Committee.

Wireless Section.—Tuesday, March 10th, 6 p.m. Informal meeting on "Frequency Stability of Tuned Circuits : (*a*) Materials, (*b*) Components and (*c*) Complete Assembly," to be opened by Messrs. G. P. Britton, C. W. Eggleton and A. H. Cooper, respectively.

Transmission Section. — Wednesday, March 11th, 6 p.m. "Short-circuit Rating and Testing of Current-Limiting Reactors," by Messrs. J. G. Wellings and R. V. Wheeler.

Installations Section.—Thursday, March 12th, 6 p.m. "Electrical Industrial Applications," by Mr. L. C. Grant.

North-Western Centre.—Saturday, March 7th, 12.45 for 1 p.m. Engineers' Club, Albert Square, Manchester. Wartime luncheon.

North-Eastern Centre.—Monday, March 9th, 6.15 p.m. Neville Hall, Westgate Road, Newcastle-upon-Tyne. "Voice-Frequency Signalling and Dialling in Long-Distance Telephony," by Messrs. W. G. Radley, Ph.D.(Eng.) and E. P. G. Wright. *Students' Section.*—Sunday, March 8th, 10.30 a.m. Visit to Odeon Cinema, Pilgrim Street, Newcastle. Friday, March 13th, 6.30 p.m. Neville Hall. Students' Lecture by Dr. D. S. Anderson, B.Sc., on "The Failure of the Technician in his Role as a Citizen."

Scottish Centre.—Thursday, March 12th. Edinburgh. "Electrical Industrial Installations," by Mr. L. C. Grant.

Dundee Sub-Centre.—Thursday, March 12th. Annual dinner.

Association of Mining Electrical & Mechanical Engineers.—*West Wales Branch.*—Saturday, March 7th, 5 p.m. Mackworth Hotel, Swansea. Discussion on "Report of Departmental Committee on Amendment of Electricity Regulations," to be opened by Mr. J. A. B. Horsley.

South Wales Branch.—Saturday, March 14th. Cardiff. Paper: "The Protection of AC Networks," by Mr. M. Kaufmann, A.M.I.E.E.

West of Scotland Branch.—Saturday, March 14th. "Colliery Overhead Transmission Lines," by Mr. J. McOwat.

British Institution of Radio Engineers.—Saturday, March 7th, 3 p.m. 21, Tothill Street, Westminster, S.W.1. "Harmonic Distortion in Auto-frequency Transformers," by Mr. N. Partridge, B.Sc., A.M.I.E.E.

Stoke-on-Trent Association of Engineers.—Saturday, March 7th. "Steam Turbines Applied to Industrial Plant," by Mr. J. E. Lee (Richardsons Westgarth-Brown Boveri, Ltd.)

Electrodepositors' Technical Society.—Monday, March 9th, 5.30. Northampton Polytechnic, E.C.1. "Solvent Economy in Trichlorethylene Degreasing Plants," by Mr. W. F. Jesson.

Illuminating Engineering Society.—Tuesday, March 10th, Royal Society of Arts, John Adam Street, Adelphi, W.C.2. 1.15 to 2 p.m. Sandwich luncheon. 2 p.m. Annual meeting of the National Illumination Committee. 2.30 p.m. Discussion on "Advance Planning in Lighting Reconstruction," to be opened by Mr. H. Robertson, F.R.I.B.A.

Junior Institution of Engineers.—Saturday, April 25th, 1 for 1.30 p.m. Holborn Restaurant, W.C.1. Annual luncheon.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Mather & Platt, Ltd.—Presiding at the annual meeting held on February 24th, Mr. L. E. Mather (chairman) said that the figures shown in the accounts indicated that the company had had a busy year and had maintained its strong position notwithstanding the further curtailment of its overseas trade. Production continued to be satisfactory in all their departments. They had for a long time employed women in their works, and had therefore little difficulty in making provision for their increasing number.

British Industrial Plastics, Ltd., held its annual meeting on February 26th, when Mr. K. M. Chance (chairman and managing director), who presided, in reviewing the accounts for the past year said that perhaps the most solid grounds for satisfaction in what had been achieved during the period under review were the great increase in the manufacture and sale of products other than moulding powders at Oldbury, and the way in which a greatly increased output had been achieved at Streetly.

Burma Electric Supply Co., Ltd.—The report to be presented at the annual meeting in London on March 11th shows that the total receipts for 1940-41 amounted to £33,838, against £36,502 for 1939-40. The net profit increased from £6,084 to £6,252. After meeting the preference dividend £7,110 (against £8,058) is carried forward. The company's tramway Order was revoked on December 31st, 1940, and the tramways were discontinued. The report says that it is impossible to ascertain at present the amount which will be no longer represented by tangible assets.

Midland Counties Electric Supply Co., Ltd., proposes to pay a final ordinary dividend of 5½ per cent., making 8 per cent., less tax for the year (same). The trading profit of the operating companies for 1941 totalled £778,018 as compared with £832,170 for the previous year of which £450,635 is appropriated for depreciation and reserves in operating companies. The net revenue for 1941, after tax, of the holding company was £306,182 (against £343,061).

The Bournemouth & Poole Electricity Supply Co., Ltd., has announced a final dividend of 7½ per cent., maintaining the dividend for the year at 12½ per cent.

Bruce Peebles & Co., Ltd., are paying a first and final dividend of 5 per cent., plus a bonus of 3 per cent., and a participating dividend of 2½ per cent., making 10 per cent. on the preference shares (same).

The Mersey Railway Co. has announced a dividend on the consolidated ordinary stock of £2 per cent., less tax, for 1941 (against £1 15s. per cent.).

The London Electric Supply Corporation, Ltd., has reduced its final dividend from 4 per cent. to 3 per cent., making 6 per cent. for the past year, against 7 per cent.

The Lancashire Electric Light & Power Co. is again paying a final dividend of 5 per cent., maintaining the distribution for the year at 7½ per cent.

The North-Eastern Electric Supply Co., Ltd., is paying a final dividend of 4½ per cent., maintaining the distribution for the year at 7 per cent.

The Richmond (Surrey) Electric Light & Power Co., Ltd., is maintaining its dividend for the year at 6 per cent. by the final payment of 4 per cent.

The South London Electric Supply Corporation, Ltd., is paying a final dividend of 4 per cent., again making 7 per cent. for the year.

The Newcastle & District Electric Lighting Co., Ltd., is paying an ordinary dividend of 7 per cent. for 1941 (same).

The Farnham Gas & Electricity Co., is paying a final dividend of 3½ per cent., making 6 ⅛ per cent. for the year (against 6½ per cent.).

The Ransomes & Marles Bearing Co., Ltd., has announced an interim dividend of 5 per cent., less tax (against 9 per cent.).

Clarke Chapman & Co., Ltd.—The directors report a net profit, after meeting all charges, including taxation, of £112,616 (against £122,469 for 1940). As already reported, the dividend is reduced from 12½ to 12 per cent.

International Combustion, Ltd., is paying a final dividend of 15 per cent. and a bonus of 10 per cent., making 30 per cent. for the year (same).

The Mid-Cheshire Electricity Supply Co., Ltd., has announced a first and final dividend of 8 per cent. (same).

The Direct Spanish Telegraph Co., Ltd., is again paying a first and final dividend of 5 per cent.

New Companies

A. E. Parsons, Ltd.—Private company. Registered February 23rd. Capital, £3,000. Objects: To acquire the business of an electrical contractor and wireless dealer carried on by A. E. Parsons, at 427, Sheffield Road, Whittington Moor, Chesterfield, Derby. Directors: A. E. Parsons, 427, Sheffield Road, Whittington Moor, Chesterfield, and Muriel Parsons, 31, Rhodes Avenue, Chesterfield.

Edwards & Sons (Bude), Ltd.—Private company. Registered February 21st. Capital, £10,000. Objects: To acquire the business of motor engineers and garage proprietors carried on at Bude as Edwards & Sons; also to carry on the business of electrical, wireless and general engineers, etc. Directors: T. Edwards, 6, Morwenna Terrace, Bude, and five others. Solicitors: Peter, Peter & Sons, Bude.

S. H. Hannah, Ltd.—Private company. Registered February 20th. Capital, £3,000. Objects: To carry on the business of electric control gear makers, electrical and mechanical engineers, wireless, telephonic and telegraphic engineers, etc. Directors: S. H. Hannah and Mrs. E. N. Hannah,

both of 12, Norman Road, Northfield, Birmingham, 31. Registered office: Coronation Road, Selly Oak, Birmingham.

Companies Struck off Register

The names of the following companies have been struck off the Register and they are thereby dissolved:—A.C. Mains Clocks, Ltd.; Phœnix Battery Co., Ltd.; Ready Radio, Ltd.

Companies' Returns

Statements of Capital

Madras Electric Supply Corporation, Ltd.—Capital, £1,100,000 in 476,800 preference and 623,200 ordinary shares of £1 each. Return dated August 20th (filed December 8th). 451,800 preference and 598,200 ordinary shares taken up. £944,000 paid on 398,600 preference and 545,400 ordinary shares. £106,000 considered as paid on 53,200 preference and 52,800 ordinary shares. Mortgages and charges: Nil.

Calcutta Tramways Co., Ltd.—Capital, £1,400,000 in 950,000 ordinary and 450,000 preference shares of £1 each. Return dated August 5th, (filed December 16th). 700,000 ordinary and 250,000 preference shares taken up. £764,900 paid. £185,100 considered as paid. Mortgages and charges: £592,300.

Keating and Miskin, Ltd.—Capital, £2,500 in £1 shares. Return dated October 24th, 1940 (filed January 7th, 1942). All shares taken up. £1,250 paid. £1,250 considered as paid. Mortgages and charges: Nil.

Nathan & Allen, Ltd.—Capital, £10,000 in 10,000 shares of £1 each. Return dated November 21st. 3,450 shares taken up. £1,100 paid. £2,350 considered as paid. Mortgages and charges: Nil.

W. Mackie & Co., Ltd.—Capital, £12,000 in 12,000 ordinary shares of £1 each. Return dated December 11th. 7,500 shares taken up. £3,155 paid. £4,345 considered as paid. Mortgages and charges: Nil.

Eltron (London), Ltd.—Capital, £1,000 in 750 "A" and 250 "B" shares of £1 each. Return dated September 26th (filed December 31st). 750 "A" shares taken up. £210 paid, leaving £540 in arrears. Mortgages and charges: Nil.

J. H. Graham & Son, Ltd.—Capital, £1,000 in 1,000 shares of £1 each. Return dated November 24th. 864 shares taken up. £864 paid. Mortgages and charges: Nil.

J. & M. Stone, Ltd.—Capital, £100 in 100 shares of £1 each. Return dated December 31st, 1940 (filed December 20th, 1941). 2 shares taken up. £2 paid. Mortgages and charges: Nil.

Ever Ready Electric Bulb Co., Ltd.—Capital, £10,000 in 10,000 ordinary shares of £1 each. Return dated October 9th. 2,500 shares taken up. £2,500 paid. Mortgages and charges: Nil.

Holophane, Ltd.—Capital, £100,000 in 100,000 shares of £1 each. Return dated October 10th. All shares taken up. £7 paid. £99,993 considered as paid. Mortgages and charges: Nil.

Donn Electric Co., Ltd.—Capital, £500 in 500 shares of £1 each. Return dated December 15th. 400 shares taken up. £400 considered as paid. Mortgages and charges: Nil.

Birmingham Home & Office Telephone Co., Ltd.—Capital, £2,000 in £1 shares. Return dated November 18th. All shares taken up. £2,000 paid. Mortgages and charges: Nil.

Increase of Capital

Park Royal Electrical (Maintenance) Co., Ltd.—The nominal capital has been increased by the addition of £100 in 100 shares of £1 each beyond the registered capital of £300.

Mortgages and Charges

Underwood (Electric), Ltd.—Assignment on February 11th, 1942, of proceeds of various contracts, to secure all moneys due or to become due from the company to Martins Bank, Ltd.

Receiver Released

Atkins Electrical Appliances, Ltd.—W. F. Wyatt, Sun Building, Bennett's Hill, Birmingham, ceased to act as receiver and manager on February 13th, 1942.

Bankruptcies

H. P. Ansell, trading in partnership with others as H. P. Ansell & Partners and as Engineering Services, London and Birmingham.—Discharge suspended for three months until April 14th, 1942, subject to payment to the Official Receiver as trustee for distribution among creditors of £24 by monthly instalments of £2, first payment February 1st.

E. S. Cheatle, radio and electrical dealer, 307, Lyndon Road, Sheldon, lately trading at 580, Coventry Road, Small Heath, Birmingham, as Apex Radio and Electrical Service.—Receiving order made February 17th, on debtor's own petition.

P. W. Penty (Sackville Electrical Co.), electrical contractor, 38, Mannville Terrace, Morley Street, Bradford.—Supplemental dividend of 6½d. in the £ payable March 17th at 71, Manningham Lane, Bradford.

A. L. Pearce, electrical supplies dealer, 12, Fore Street, Newquay.—Supplemental dividend of 1s. in the £, payable at 12, Princess Street, Truro.

F. J. Harrison, electrician, Dicconson Street, Wigan.—Trustee, Mr. J. Airey, 8, Victoria Street, Liverpool, released January 26th.

Liquidations

British Component Productions, Ltd., Cardiff.—At a recent meeting of creditors, at which Mr. P. Freeman, a director, presided, it was stated that the shareholders had passed the necessary resolution for the voluntary liquidation of the company and had nominated Mr. L. S. Findlay (Poppleton & Appleby, 35, Windsor Place, Cardiff), as liquidator. A statement of affairs at January 30th last showed ranking liabilities of £13,802 and net assets of £2,493, leaving a deficiency, as regarded the creditors, of £11,309. Negotiations were pending for the sale of the business as a going concern, but no offer had yet been received.

It was decided that the voluntary liquidation should be continued with Mr. Faraday as liquidator, with a committee.

STOCKS AND SHARES

TUESDAY EVENING.

THE beginning of March should normally, by Stock Exchange tradition, be a time of mixed currents so far as markets are concerned. Investment of money at this period of the year is usually on a fairly extensive scale; but, on the other hand, with the Budget drawing near, caution dictates a policy of prudence with regard to fresh commitments. This year, the cross-currents are more than usually numerous. Throughout this present week, millions of money are being distributed to previous holders of India Government 3 and 2½ per cent. issues. Many of these millions are going back into National War Bonds and other forms of Government borrowing. Warship Weeks are absorbing substantial amounts of capital. Nevertheless, the Stock Exchange markets are being closely examined with a view to investment of money that requires a higher rate of interest than the gilt-edged stocks afford.

Industrial stocks and shares, with few exceptions, hold their prices. An interesting rumour last week reported that an order to buy two million pounds' worth of popular industrial shares had been in course of execution.

Home Railway Stocks

Prices of all the leading Home Railway stocks are now quoted ex dividend. At the adjusted ex dividend quotations, the junior stocks return an average of rather over 10 per cent. on the money. One of the few exceptions is London Passenger Transport "C" stock, on which the yield, on the basis of the dividend of 2⅞ per cent. for last year, comes to seven guineas per cent., making the stock look expensive by comparison with Home Railway stocks in the lower categories. Southern Railway preferred has gone back to 62½ ex dividend, in company with most of the others. It is obvious that the public do not care for Home Rails as investments: it is less obvious why this prejudice should be so widely spread. Possibly the fear of formidable labour demands may have something to do with the reluctance on the part of investment to accept the high returns offered at to-day's prices.

Transport Board Redeemable Stock

The London Passenger Transport Board has amongst its various issues £12½ millions of 4½ per cent. Trade Facilities Act stock, which arose out of stock, bearing a similar rate of interest and dated 1942/72, of the London Electric, Central London and City and South London Railway Companies. The existing stock bears similar date, 1942/72, and the Board has the right to redeem it at par after January 1st, 1942, upon giving three months' notice. For some time past the quotation has been standing in the neighbourhood of 100. It is thought that the Board may take advantage of present cheap money conditions and replace this issue with another that will bear a lower rate of interest, following the example set by other concerns. The opportunity for doing so is afforded, of course, by the Government's financial policy, which has been so successful since the outbreak of war. The matter has already been mentioned in the ELECTRICAL REVIEW. Any company with an issue of redeemable stock, or of shares, that could be paid off or replaced by another issue at a cheaper interest rate, will take this question into consideration.

Movements in Prices

The dividend season for Home electricity companies is now in full swing. London shares are firm: South Londons have gained a florin at 27s., and City Lights are 6d. up at 27s. 6d. Isle of Thanet at 10s. have recovered 1s. of their recent loss. Amongst communication shares, Oriental Telephones are 2s. 6d. down, at 50s.: it may be remembered that the price touched 72s. last year. Anglo-American Telegraph preferred and deferred have improved to 108½ and 25 respectively. Demand is reviving for Brazilian descriptions: Brazilian Tractions are ⅜ better at 13¼. Thomas Tilling at 47s. 6d. have put on ⅛.

The manufacturing and equipment group keeps firm. A gain of 2s. lifted Arons to 25s. British Insulated recovered to 92s. 6d. Mather & Platt went back to 39s. 6d. and British Aluminium to 43s. 6d. Shares connected with the heavy industries are inclined to sag. Babcock & Wilcox at 43s. 3d. have gone back 6d., while Vickers show no change at 16s. 3d.

Indian Utilities

Cable & Wireless stocks have failed to recover from the apprehension induced by the activities of the Japanese in the Far East. Globe Telegraph ordinary and preference shares have each shed ⅛. The Australian Government's drastic financial policy is not yet sufficiently understood to enable stocks and shares in companies connected with the Dominion to find a firm foundation, the result being that quotations are, in many cases, more or less nominal. India utility issues are weak. Falls are marked in Calcutta, Cawnpore and Madras Electrics. Calcutta Trams declined to 13s. 9d. Rangoon Electric Trams at 15s. are 6s. 3d. down. Singapore Tractions, which last changed hands in October, 1941, at 18s. 6d., are now about 10s. 4d. In the South African group, Victoria Falls are better at 72s. 6d.

Signals and Brakes

The report of the Consolidated Signal Co. is, as usual, colourless, because there is little

(*Concluded on page* 321)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Mar. 2	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	15	12½	55/-	..	4 11 0
British Power and Light	7	6	27/6	..	4 7 3
City of London	7½	7	27/6	+6d.	5 1 9
Clyde Valley	8	8	38/9	..	4 2 0
County of London	10½	8	37/6	..	4 5 6
Edmundson's:					
7% Pref.	7	7	33/3	..	4 4 4
Ord.	6	6	28/6	..	4 4 3
Elec. Dis. Yorkshire	9	9	42/-xd	..	4 5 9
Elec. Fin. and Securities	12½	12½	45/-	..	5 11 2
Elec. Supply Corporation	11¼	10	45/-	..	4 9 0
Isle of Thanet	2	Nil	10/-	+1/-	—
Lancs Light and Power	7½	7½	34/6	..	4 7 0
Llanelly Elec.	5½	5½	23/-	..	4 16 8
Lond. Assoc. Electric	5½	4½	18/9	..	4 16 0
London Electric	7	6	24/6xd	..	4 19 0
London Power Deb. Red.	5	5	105	..	4 15 3
Metropolitan	10	8	37/-	..	4 6 6
Midland Counties	8	8	38/9	..	4 2 0
Mid. Elec. Power	9	9	41/3	..	4 7 4
Newcastle Elec.	7	7	27/6	..	5 1 10
North Eastern Elec.:					
Ordinary	7	7	30/9	..	4 11 1
7% Pref.	7	7	34/-	..	4 2 4
Northampton	10	10	46/3	..	4 6 7
Notting Hill 6% Pref. (£10)	6	6	8½	..	—
Northmet Power:					
Ordinary	10	7	35/9	..	3 18 4
6% Pref.	6	6	31/-	..	3 17 5
Richmond Elec.	6	6	23/9	..	5 1 1*
Scottish Power	8	8	38/9	..	4 2 9
Southern Areas	5	5	19/6	..	5 2 8
South London	7	7	27/-	+2/-	5 3 8
West Devon	5	5	21/3	..	4 14 1
West Glos.	4½	4½	21/3	..	4 4 8
Yorkshire Elec.	8	8	39/6	..	4 1 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	4/3	..	—
Calcutta Elec.	8*	7*	25/9	−½	—
Cawnpore Elec.	10	10	27/6	−1/6	7 5 6
East African Power	7	7	27/-	..	5 3 8
Jerusalem Elec.	7	5	18/9	..	5 6 8
Kalgoorlie (10/-)	7½	7½	9/6	..	7 12 10
Madras Elec.	6*	4*	17/6	−1/6	4 11 5
Montreal Power	1½	1½	22½	−1	6 5 0
Palestine Elec. "A"	Nil	Nil	20/9	..	—
Perak Hydro-elec.	6	7	6/3	..	22 8 0
Shawinigan Power	83cts.	90cts.	14½	..	—
Tokyo Elec. 6%	6	6	12½	..	—
Victoria Falls Power	15	15	72/6	+1/6	4 2 9
Whitehall Inv. Pref.	7½	7½	15/-	..	10 0 0

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Mar. 2	Rise or Fall	Yield p.c. £ s. d.
Public Boards					
Central Electricity:					
1950-70	5	5	110	..	4 11 1
1955-75	5	5	115	..	4 7 0
1951-73	4½	4½	109	..	4 2 7
1963-93	3½	3½	103	..	3 8 0
1974-94	3¼	3¼	99	..	3 5 8
London Elec. Trans. Ltd.	2½	2½	94	..	2 13 2
London & Home Counties 1955-75	4½	4½	109	..	4 2 7
Lond. Pass. Trans.:					
A	4½	4½	119½	..	3 15 1
B	5	5	119½	..	4 3 8
C	3	2½	39	..	7 7 5
West Midlands J.E.A. 1948-68	5	5	110	..	4 11 0
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	108½	+1	5 10 8
Def.	1½	1½	25	+½	6 0 0
Anglo-Portuguese	8	8	15/-	..	10 13 1
Cable & Wireless:					
5½ Pref.	5½	5½	96½	..	5 14 0
Ord.	4	4	58½	..	6 16 9
Canadian Marconi $1	Nil	4cts.	5/6	..	3 0 0
Globe Tel. & Tel.:					
Ord.	8¼*	8¼*	28/9	−1/6	—
Pref.	6	6	27/6	−1/6	4 7 1
Great Northern Tel.:					
(£10)	20	20	14½	..	—
Inter Tel. & Tel.	Nil	Nil	3	..	—
Marconi-Marine	7½	7½	28/9	..	5 4 1
Oriental Tel. Ord.	11½*	16	50/-	−½	6 8 0
Telephone Props.	6	6	10/-	..	12 0 0
Tele. Rentals (5/-)	10	10	9/-	..	5 11 1
Traction and Transport					
Anglo. Arg. Trans.:					
First Pref. (£5)	Nil	Nil	5/-	..	—
4% Inc.	Nil	Nil	9½	..	—
Brit. Elec. Traction:					
Def. Ord.	45	45	915	..	4 18 3
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8	10	45/-	..	4 9 0
Brazil Traction	$1	50c.	13½	+3/8	—
Calcutta Trams	8	5½	15/-	−1/8	7 6 8
Cape Elec. Trams	5	5	18/6	..	5 8 3
Lancs Transport	10	10	45/-	..	4 9 0
Mexican Light:					
1st Bonds	5	5	75½	−2	6 12 5
Rio 5% Bonds	5	5	96½	..	5 3 8
Southern Rly.:					
5% Prefd.	5	5	62½	−1	8 0 0
5% Pref.	5	5	105½xd	−¾	4 14 9
T. Tilling	10	10	47/6	+1/8	4 4 2
Tilling & B.A.	7*	6½*	52/6	..	2 9 6
West Riding	10	10	40/-	..	5 0 0

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Mar. 2	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron Elec. Ord. ..	Nil	7½	25/–	+2/–	6 0 0
Assoc. Elec. :					
Ord.	10	10	46/3	..	4 6 9
Pref.	8	8	38/9	..	4 2 4
Automatic Tel.& El.	12½	12½	48/9	..	5 2 6
Babcock & Wilcox	11	11	43/3	—6d.	5 1 6
British Aluminium	12½	10	43/9	—9d.	4 11 4
British Insul. Ord.	20	20	92/6	+⅛	4 6 6
British Thermostat (5/–)	18½	18½	13/9	..	6 14 6
British Vac. Cleaner (5/–)	12½	10	11/3	..	4 9 0
Brush Ord. ..	Nil	Nil	4/6	..	—
Callender's ..	15	15	72/6	..	4 2 9
Chloride Elec.Storage	15	15	72/6	..	4 2 9
Consolidated Signal	17	17	77/6	..	4 7 8
Crabtree (10/–) ..	17½	17½	29/6	..	5 18 8
Crompton Parkinson Ord. (5/–) ..	30	20	22/6	..	4 9 0
E. K. Cole (5/–) ..	Nil	7	9/6	..	3 13 9
E.M.I. (10/–) ..	Nil	6	13/9	..	4 7 3
Electric Construction	10	10	34/6	..	5 16 0
Enfield Cable Ord.	16½	12½	55/–	..	4 11 0
Elecl. Switchgear (10/–)	16	10	20/–	..	5 0 0
English Electric ..	10	10	38/9	..	5 3 0
Ensign Lamps (5/–)	25	25	16/3	..	7 13 10
Ericsson Tel. (5/–)..	25*	22*	41/3	..	2 13 3
Ever Ready (5/–) ..	40	40	31/–	..	6 9 0
Falk Stadelmann ..	7	7½	22/–	..	6 16 4
Ferranti Pref. ..	7	7	27/6	..	5 1 10
G.E.C. :					
Pref.	6½	6½	33/9	..	3 17 2
Ord.	20	17½	82/6	..	4 5 6
Greenwood & Batley	15	13	27/6	..	9 9 0
Hall Telephone(10/-)	15	10	17/6	..	5 14 3
Henley's (5/–) ..	20	20	22/6	..	4 9 1
4½% Pref. ..	4½	4½	21/3	..	4 4 8
Hopkinsons ..	15	15	47/–	..	6 7 10
India-Rubber Pref.	5½	5½	21/3	..	5 3 6
Intl. Combustion ..	32½	30	107/6	..	5 11 6
J. Lucas	15	15	68/9	..	4 7 3
Johnson & Phillips	15	15	58/9	..	5 2 0
Lancashire Dynamo	20	20	66/3	..	6 0 10
Laurence, Scott (5/-)	15	15	11/–	..	6 16 4
London Elec. Wire	7½	7½	28/3	..	5 6 2
Mather & Platt ..	10	10	39/6	—9d.	5 1 3
Metropolitan Elec. Cable Pref. ..	5½	5½	21/3	..	5 3 6
Murex	20	20	90/–	..	4 9 0
Pye Deferred (5/-)..	25	25	15/–	..	8 6 8
Revo (10/–) ..	5	20	25/7½	..	7 16 0
Reyrolle	12½	12½	57/6	..	4 7 0
Siemens Ord. ..	7½	7½	26/3	..	5 14 3
Strand Elec. (5/–)	2	4	3/6	..	5 14 4
S. Smith (1/–) ..	50	37½	7/–	..	5 7 2
Switchgear & Cowans (5/–).. ..	10	15	10/–	..	7 10 0
Tel. Condenser (10/–)	Nil	5	11/3	..	4 9 0
T.C. & M.	10	10	41/3	..	4 17 0
Telephone Mfg. (5/-)	9	9	9/–	..	5 0 0
Tube Investments..	23¾	20	85/–	..	4 14 3
Vactric (5/–) ..	4	Nil	4/6	+3d.	—
Vickers (10/–) ..	10	10	16/3	..	6 3 1
Ward & Goldstone (5/–)	20	20	19/–	..	5 5 3
Westinghouse Brake	10	10	50/–	..	4 0 0
Walsall Conduits (4/-)	55	55	32/6	..	6 15 4
West, Allen (5/-) ..	7½	7½	5/9	..	6 10 5

* Dividends are paid free of Income Tax.

Stocks and Shares (*Concluded from page* 319)

to say that is not relative to the Westinghouse Brake & Signal Co., Ltd. The assets of the Consolidated Signal Co. consist principally of £391,000 ordinary stock in the Westinghouse Brake Co., and for most purposes the two companies are more or less one. The question has been raised on various occasions as to why they could not be fused into a single undertaking, since this would eliminate expense and labour. The difficulty which seems to stand in the way is the fact that the Consolidated Signal Co. has an issue of £214,000 in 6 per cent. preference stock, whereas the capital of the Westinghouse Brake & Signal Co. consists wholly of ordinary stock. It might be thought, however, that at a time when efforts are being made in every direction to reduce redundant expenditure, a fusion of these two companies into a single concern could be accomplished without any great difficulty.

Preference Shares

To such a length has the demand for good-class shares persisted, that in the electricity market there are few preference obtainable at prices which will allow a yield of much more than 4 per cent. on the money. The explanation of these high prices and low returns lies partially in the fact that insurance companies, and certain others entrusted with the investment of the public's money, fix a certain rate of yield that will satisfy the claims of the life, or other departments. Having decided what rate of income it requires, the insurance company will either buy in the market, or will take directly from the company in large lines, all shares that are available. When an insurance company invests its money in this way, it may quite easily happen that the shares remain in the same possession undisturbed for several years. In other words, the shares are taken for purely permanent investment and never come into the market at all. Hence the gradual disappearance of supplies of shares from the Stock Exchange market. With few new issues of any consequence being allowed to appear at the present time, the private investor finds that he has to give, much against his inclination, prices that allow but modest return upon his capital.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *can be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

1939

20471. "Arrangement for separating electric currents of different frequency." Telefonaktiebolaget L. M. Ericsson. July 13th, 1938. (543045.)

1940

3812. "Sound-recording systems." Radio Corporation of America. March 24th, 1939. (542923.)

4362. "Phase-modulated telegraph system." Standard Telephones & Cables, Ltd., F. Ralph and F. Fairley. March 8th, 1940. (543048.)

5919. "Wire and the like spooling machines." H. J. Lloyd and S. H. Richards. April 2nd, 1940. (542957.)

6551. "Rotatable hose couplings for sucking or blowing devices, for example, vacuum cleaners." Van Der Heem, N.V. October 26th, 1939. (542958.)

7891. "Electron-discharge devices." J. D. McGee, H. Miller and G. S. P. Freeman. May 2nd, 1940. (543022.)

7988. "Protective equipment for electrical power systems." T. W. Ross and Metropolitan-Vickers Electrical Co., Ltd. May 3rd, 1940. (542993.)

8107. "Phase-modulated telegraph system." Standard Telephones & Cables, Ltd., F. Ralph and F. Fairley. May 6th, 1940. (543050.)

8762. "Electron-beam deflecting circuits." Philco Radio & Television Corporation. June 16th, 1939. (542994.)

9631. "Electrically heated articles of apparel." Z. U. Munschak and J. Wolodarsky. June 1st, 1939. (542960.)

9722. "Facsimile telegraph systems." Creed & Co., Ltd., A. E. Thompson and R. D. Salmon. June 3rd, 1940. (543023.)

9811. "Apparatus for frequency measurements." Electrical Research Products, Inc. July 26th, 1939. (543051.)

9812. "Frequency indicators." Electrical Research Products, Inc. July 26th, 1939. (543052.)

11119. "Magnetic apparatus for measuring the thickness of thin layers." W. H. Tait and B. Chalmers. July 1st, 1940. (542968.)

11207. "Remote-control systems." F. V. Brown. July 3rd, 1940. (542998.)

11307. "Relays of the plug-in type, and jacks therefor." Standard Telephones & Cables, Ltd., and W. H. M. Hellier. July 5th, 1940. (543059.)

12309. "Oscillation generation systems." Marconi's Wireless Telegraph Co., Ltd. July 28th, 1939. (542970.)

12312. "Electron-discharge devices." Marconi's Wireless Telegraph Co., Ltd. July 29th, 1939. (542971.)

12335. "Current and voltage indicators for direct-current circuits." V. A. Sheridan. July 30th, 1940. (543061.)

12343. "Valve circuits with electronic discharge." Standard Telephones & Cables, Ltd. August 2nd, 1939. (542930.)

12369. "Systems for the remote supervision of circuit-breakers or the like in electric supply networks." Automatic Telephone & Electric Co., Ltd., G. A. Burns and J. V. Richardson. July 31st, 1940. (542931.)

12380–5. "Resinous condensation products, and methods of producing same." British Thomson-Houston Co., Ltd. August 9th, 1939. (542932–4 and 542972–4.)

12471. "Preventing radio interference from electric switches, particularly switches for controlling internal-combustion engines." Bendix Aviation Corporation. August 2nd, 1939. (543000.)

12525. "Conducting-liquid electric switches." F. Colby. August 2nd, 1940. (543001.)

12591. "Illuminated gun sights and like sighting devices." G. G. Dawson. August 5th, 1940. (543031.)

12613. "Direct-current voltage changers." Philco Radio & Television Corporation. September 8th, 1939. (543032.)

12629. "Telephone systems." Automatic Telephone & Electric Co., Ltd., and C. E. Beale. August 6th, 1940. (543065.)

12642. "Electric signal transmission systems." Standard Telephones & Cables, Ltd., and W. Kram. August 6th, 1940. (543067.)

12643. "Electrical counting systems." Standard Telephones & Cables, Ltd., and R. M. Barnard. August 6th, 1940. (543068.)

12652. "Magnetic compasses." E. L. Holmes, A. J. Hughes and H. Hughes & Son, Ltd. August 6th, 1940. (543069.)

12790. "Premagnetisation self-inductances, and the circuits which employ them." Standard Telephones & Cables, Ltd. August 11th, 1939. (542979.)

12991. "Electron-discharge amplifiers." British Thomson-Houston Co., Ltd. August 17th, 1939. (543035.)

13006. "Electric storage water-heaters." D. B. Knox and W. L. Walters. August 9th, 1939. (542945.)

13955. "Metal-vapour electric-discharge devices." J. E. White. September 7th, 1939. (543072.)

14559. "System and apparatus for facsimile telegraphy." Creed & Co., Ltd. (Western Union Telegraph Co.). September 25th, 1940. (543037.)

14708. "Production of induction apparatus with rolled strip cores." British Thomson-Houston Co., Ltd. September 28th, 1939. (543004.)

15546. "Electro-magnetic relays with mercury contacts." Electrical Research Products, Inc. November 2nd, 1939. (543008.)

16350. "Machines for use in the production of electric lamps and similar devices." British Thomson-Houston Co., Ltd. November 9th, 1939. (543079.)

17552. "Light buoys for seadromes or the like." Westinghouse Electric International Co. December 13th, 1939. (543010.)

1941

2657. "Heat-exchange devices." British Thomson-Houston Co., Ltd. March 1st, 1940. (543018.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—POSTMASTER-GENERAL'S DEPARTMENT.—March 17th. Carrier telephone equipment, Schedule C.3638. March 24th. V.i.r. lead-covered cable, Schedule C.3630.

SYDNEY COUNTY COUNCIL.—March 15th. 33,000-V cable, Specification 581. March 19th. Motor-driven, fixed type vacuum cleaning plant for Bunnerong power station, Specification 570. April 30th. Steam and feedwater piping for No. 10 turbo-alternator at Bunnerong, Specification 559 (time extended from January 29th).

Edinburgh.—March 7th. Town Council. Maintenance of house telephones for one year from May 16th. Form of tender from the city architect, City Chambers.

Leeds.—March 9th. Town Council. Electric heating and ventilating installation at Quarry Hill shelters (Contract No. 188). Specifications and tender forms from R. A. H. Livett, housing director, Priestley House, Quarry Hill.

Luton.—March 10th. Town Council. Primary substation building. Plans, specifications, etc., from the general manager and chief engineer, Electricity Offices, St. Mary's Road.

Nottingham.—March 31st. City Water Department. Centrifugal borehole and booster pumps, complete with electric motors, switchgear and other works. Specification and form of tender from B. W. Davies, engineer and general manager, Water Department, Castle Boulevard.

Salford.—With regard to the note in our issue of February 20th we are informed by the city electrical engineer that tenders are not being invited for the commodities specified, and that any purchase of these items by the Department during the year ending March 31st, 1943, will be made in the open market.

South Africa.—PUBLIC WORKS DEPARTMENT.—April 2nd. Electrical materials and fans. P.W.D.41.

RAILWAYS AND HARBOURS.—March 30th. Automatic telephones. Tender 3475.

DURBAN.—City Council. March 27th. Pumps, motors, valves and electrical equipment for emergency water scheme. Contract W.47/US, April 17th. 3,300-V switch cubicles (Contract E.2045). May 15th. Turbo-generator sets, switchgear and Diesel-engined starting set (Contract W.45/US).

Orders Placed

Durham.—County Council. Accepted. Electrical installation at the Greenfield and Low Greenfield Farms (£240).—R. Robson.

London.—BATTERSEA.—Electricity Committee. Accepted for twelve months. Electricity meters. —Chamberlain & Hookham; Ferranti. Joint boxes, house service cut-outs and underground cables. — Callender's. Disconnecting boxes, copper wire and insulating tape.—Henley's. Joint box compound. — Dussek Bitumen & Taroleum. Electrical wires for installation work. —Stearn Electric Co. Flexible wires and wiring accessories.—Wm. White & Co. Steel sheathing and fixing clips.—Wholesale Electric Co. Conduit and conduit fittings.—Sloan Electric Co. Switches (5-A) and cooker control units.—J. A. Crabtree & Co.

DEPTFORD.—Emergency Committee. Accepted. Electric hammer (£35).—Vale Plant Register, Ltd.

Manchester.—Electricity Committee. Accepted. Spare elements for air heaters.—Jas. Howden & Co. (Land), Ltd.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Airdrie.—British Restaurant at Community Service Club (£1,782); burgh surveyor, Royal Buildings, Graham Street.

Alsager.—Public offices and assembly hall for U.D.C.; H. V. Lynam, surveyor, Council Offices, Lawton Road, Alsager, Cheshire.

Ancoats.—Additions to works; Jones & Dalrymple, architects, 178, Oxford Road, Chorlton-on-Medlock, Manchester.

Bacup.—British Restaurants at Irwell Terrace and Acre Mill, Stacksteads; H. Guffogg, borough engineer, Municipal Offices, Stubbylee Hall.

Billingham.—Shelters (£2,801); A. E. Hobbs (Contractors), Ltd.

Birkenhead.—Hostel (£3,000); E. W. Tame, town clerk, Town Hall.

Bournemouth.—Cleansing station and first-aid posts (£1,862); residential nursery, Castlemain Avenue, and day nursery, Wellington Road; borough engineer.

Cardiganshire.—School canteens (£10,000); J. Lewis Evans, architect, 21, Darkgate Street, Aberystwyth.

Cheshire.—Nurseries at Okell Street, Runcorn; Church Walk playing fields, Northwich; and Siddon Street, Winsford; E. M. Parkes, county architect, The Castle, Chester.

Chester-le-Street.—Air-raid shelters; H. F. Mole, builder, Broadwood View.

Chorlton-on-Medlock.—War-time nursery at Plymouth Grove (£1,791); G. Noel Hill, city architect, Town Hall, Albert Square, Manchester, 2.

Colwyn Bay.—Additional infectious diseases accommodation; N. S. Jeffrey, borough engineer, Town Hall.

Coventry.—Additions to Coundon, Wyken, Cheylesmore and John Gulson Council Schools (£3,000); D. E. E. Gibson, city architect, 1a, Warwick Row.

Daventry.—British Restaurants at Braunstone, Long Buckley and West Hallam for R.D.C.; W. C. Childs, surveyor, Council Offices, New Street.

Derbyshire.—Hutments for school canteens and cooking centres (£17,000); J. Harrison, county architect, County Offices, St. Mary's Gate, Derby.

Dewsbury.—Day nursery at Eightlands House; M. H. Forward, borough architect, Town Hall.

Additions, for H. Day & Sons, Ltd., cloth manufacturers.

Durham.—Schemes approved for providing meals at Durham Johnston, Hartlepool Henry Smith, Ryhope, and West Stanley Secondary Schools; F. Willey, 34, Old Elvet, Durham.

Shelters at Hebburn for Durham County Council; D. Glen, builder, Back Queen's Road, Jarrow-on-Tyne.

Edmonton.—Additions to hospital for Middlesex County Council (£1,646); H. E. Winskell & Son, Ltd.

Glasgow.—Abattoir additions, Melbourne Street (£1,190); C. Gray & Son, Ltd.

Canteen at colliery; Garscube Colliery Co., Ltd.

Guildford.—First-aid post (£536); Stanley Ellis, Ltd.

Fifteen garages with electric heaters; dormitory shelters, Stoughton Road (£1,340); and restaurants, Borough Hall and Merrow Village Hall; borough engineer.

Hampshire.—Cooking depots, and approved school, Andover Road, Winchester; county architect, Winchester.

Honiton.—Fire station; town clerk, Queen's House.

London.—Temporary schools (£7,000); L.C.C. architect.

Shelters, Penfold Street, St. Marylebone (£2,232); borough engineer.

Nurseries, Islington (£3,760); borough architect.

Macclesfield.—Re-building offices, Hurdsfield Road; Brocklehurst-Whiston Amalgamated, Ltd., spinners, Hurdsfield Mills.

Machynlleth.—Catholic Church, accommodation for 100; Priest-in-charge, Catholic Church, Machynlleth.

Manchester.—Nurseries at Collyhurst and Gorton; city architect.

Middlesex.—Eight huts for central kitchens (£1,258 each); county architect, Middlesex House, 20, Vauxhall Bridge Road, London, S.W.1.

School kitchens (£10,064); nurses' accommodation, West Middlesex hospital (£1,482); and youth centre, Greenford (£1,028); county architect.

A.R.P. works, Hillington, Harefield and Stanies Hospitals (£6,266); W. S. Try, Ltd., and McLaren Bros.

Millom.—Softening and filtering station, etc., for R.D.C.; Taylor & Wallin, engineers, 13, Lansdowne Terrace East, Gosforth.

Newbury.—Nursery centre, Victoria Park (£3,099); Cooke Bros., Ltd.

Northants.—Canteens, Broughton, Gretton and Walgrave; county architect.

North Shields.—Office and sheds, Burdon Main Row; A. Blackie.

British Restaurants in Charlotte Street and New York village, for Tynemouth Town Council; D. M. O'Herlihy, borough engineer, Council offices, Howard Street, North Shields.

Northumberland.—Decontamination laundries, Berwick and Hexham, for County Council; W. W. Tasker, county architect, Mitford Road Offices, Morpeth.

Electric lighting in all surface shelters and some trench shelters at Blyth; A. Cheyne, county surveyor, Mitford Road, School Offices, Morpeth.

Nottingham.—School, Bramcote Lane, Wollaton; J. E. Richards, town clerk, Guildhall.

Ormskirk.—Booster station (£500), for West Lancs. R.D.C.; surveyor, Council Offices, 52, Derby Street.

Oxfordshire.—British Restaurants at Banbury, Burford, Chipping Norton, Charlbury and Witney; county architect, 3, Becket Street, Oxford.

Poole.—Canteen at Henry Harbin Senior School (£3,503); J. R. Barron, borough engineer, Municipal Buildings, Park Gates East.

Preston.—Pump house; G. G. Baines, architect, 12, Guildhall Street, Preston.

Salford.—Basement air-raid shelters at Ordsall Lane (£3,500); W. A. Walker, city engineer, Town Hall, Bexley Square, Salford, 3.

Messroom at bus station; W. A. Walker, borough engineer, Town Hall, Bexley Square, Salford, 3.

Scarborough.—Hostel for aged and infirm; borough surveyor, Town Hall.

Skelmersdale.—Installation of electric light in Mission School shelters; E. S. Robotham, surveyor, Council Offices.

Stoke-on-Trent.—Youth centres at Abbey Hulton and Stanfield, and British Restaurant at Hanley; A. Burton, city engineer, Town Hall.

Sunderland.—Three new kitchens at Prospect Row, the old Colliery School and in Hylton Road; O. T. Mark, architect to the Education Committee, Tatham Street, Sunderland.

Surrey.—Thirteen additional school canteens (£1,876); county architect, County Hall, Kingston-on-Thames.

Sutton Coldfield.—Restaurant, Holland Road; borough engineer.

Wokingham.—Pumping station and sewage disposal works for R.D.C.; Howard Humphreys & Sons, engineers, 7, Eldon Square, Reading, Berkshire.

Wolverhampton.—Office block, Warren Road; Jackson & Edmonds, architects, 24, Bennett's Hill, Birmingham, 2.

Wrenthorpe.—Village hall; secretary, Wrenthorpe Community Council, near Wakefield, Yorks.